A MULTI-LEVEL ANALYSIS OF FOREST POLICIES IN NORTHERN VIETNAM: UPLANDS, PEOPLE, INSTITUTIONS AND DISCOURSES

By
Floriane Cecile Clement

Thesis submitted
for the degree of Doctor of Philosophy (PhD)
at Newcastle University

School of Civil Engineering and Geosciences
School of Geography, Politics and Sociology
Newcastle University, NE1 7RU (UK)

May 2008

Abstract

The dissertation presents a thorough analysis of forest policies in Northern Vietnam which simultaneously apprehends the biophysical conditions, institutions, discourses and socio-politico-economic context in which actors are embedded. The analysis is based on the case study of two sets of policies: the Five Million Hectares Reforestation Programme (5MHRP), a state-led afforestation campaign, and forestry land allocation (FLA) to households. The study is innovative in several respects. Firstly, it focuses on the impact of these policies on land use and management, which has not so far deserved much attention. Secondly, it develops and uses an enriched version of Ostrom's Institutional Analysis and Development (IAD) framework (Kiser and Ostrom, 1982) aiming at "politicising" it, i.e. making it better suited to policy-process analysis. Thirdly, it applies this original framework at multiple levels, bringing fresh insights on cross-scale linkages, and uses an historical perspective to develop a dynamic understanding of policy outcomes. Fourthly, it collates several qualitative and quantitative methodologies to investigate the topic from a variety of angles.

Results indicate that from a regional outlook, the 5MHRP has not succeeded in involving households in forestry and FLA has had little impact on afforestation. Rather, the individual-property regime has been observed to be ill-adapted to the socio-ecological settings of Northern Vietnam. Underlying drivers for these poor achievements result from a complex combination of the upland biophysical conditions, socio-political-economic setting, institutions and discourses. One of the most important contributions of the study is to disclose the co-production and co-action of these variables at multiple institutional and geographical levels.

Policy recommendations include: (1) increasing the accountability of state administration to higher governance levels and to the population; (2) improving policy-makers' mental representation of the mountainous socio-ecological systems; and (3) adapting institutions to their complexity and diversity of upland systems by devolving greater responsibilities to local people.

Table of contents

List of Boxes

List of Figures

List of Maps

List of Pictures

List of Tables

Table of contents

List of Boxes

List of Figures

List of Maps

List of Pictures

List of Tables

Acknowledgements

Many researchers talk about their Ph.D. experience as a valuable, instructive but also painful period of their life. To me, these past four years have been invaluable, highly formative and very enjoyable. I owe this to a great extent to the many people who have contributed more or less closely and directly to my research study.

My very first thanks go to my supervisors: Dr. Jaime Amezaga, Prof. Ian Calder and Dr. Andy Large from Newcastle University for their invaluable scientific guidance. I have been very lucky to have such a friendly and supportive supervisory team. Doing research under their supervision has been such a fantastic experience I would be ready to start a new Ph.D. again.

I am also particularly indebted to Dr. Didier Orange from the French Institute of Research for Development (IRD) who was my fieldwork supervisor in Vietnam. Didier committed himself to this research project while at the same time granting me a great freedom to conduct fieldwork. Didier showed an interest in social sciences not common among hydrogeochemists which led to stimulating discussions I greatly appreciated. *Merci à toi* Didier.

Special acknowledgement of financial support is attributed to: the British Council for awarding an Entente Cordiale scholarship and the French "*Fondation Marcel Bleustein-Blanchet*" for awarding a "*Bourse pour la Vocation*" grant. Fieldwork was also possible thanks to the IRD through a research fellowship position and funding from the Management of Soil Erosion Consortium (MSEC) research programme sponsored and coordinated by the International Water Management Institute Southeast Asia (IWMI-SEA) and from the *Promotion du Développement Durable dans les systèmes de Recherche Agricole du Sud* (DURAS) project sponsored by the French Ministry of Foreign Affairs. Thanks to Dr. Christian Valentin from IRD and Dr. Andrew Noble from IWMI-SEA to provide a supportive scientific frame for my work in Vietnam.

My very sincere thanks go to Dr. Tran Duc Toan, vice-director of the Vietnamese Soil and Fertiliser Research Institute (SFRI) in Hanoi, to welcome me at his institute and to provide essential support to my fieldwork. I truly appreciated Toan's dedication to improving farmers' livelihoods and humbleness.

My fieldwork in Tien Xuan Commune was highly enjoyable and unforgettable thanks to all villagers from Dong Cao, Dong Dau and Que Vai. I am afraid I can ever give them as much as they gave me: happiness, smiles, a share of their daily meal and a glass of their best *rượu*. Special thanks to Mr. Thao's family for their hospitality and kindness. *Cảm ơn ông bà và hai em.* I was very lucky to work with Emmanuel Pannier (Manu) who always accompanied me in the *rượu* contests. His ethnologist perspective provided very valuable inputs to my research. Thanks to Nguyen Duy Phuong to help me conducting fieldwork in Tien Xuan Commune with such a great efficiency and incredible sense of humour.

I am grateful to Chi, Hien, Hue and Ly, who in addition to doing a great job of interpretation under hard working conditions, taught me fruit picking, ever-lasting smiles, cooking and Vietnamese war songs. Thanks to Phai to introduce me to researchers in Hanoi for my interviews. Thanks to lovely Giang to travel on the backseat of my motorbike to Hoa Binh Province without ever complaining. She also proved her great patience and perspicacity when arranging interviews with provincial authorities. Ha, Hai An, Pascal baba, Pascal Podwo and Rinh, thank you to be so kind colleagues – a special thanks to Pascal Podwo to bring so much life in the office!

I am indebted to many development practitioners and researchers, whom I cannot all name here, for providing me assistance in doing fieldwork in Hoa Binh, Yen Bai, Thai Nguyen and Son La Provinces. Thanks to all provincial and central bureaucrats, donors, development practitioners I met to grant me some of their time for interviews.

Thanks to the researchers from IPSARD and particularly Vu Trong Binh for their interest in my work and to help me disseminating my results. Thanks to Ms. Nguyen Anh Chi, Dr. Vu Kim Chi and GTZ in Vietnam to help me translating policy briefs. Thanks to Dr. Michael Epprecht and Patrick Meyfroidt for sharing their data.

Invaluable methodological and technical support was provided by Dr. Meredith Williams, Newcastle University on satellite image analysis and Dr. Corinne Mulley, Newcastle University on the use of Geographically Weighted Regression.

I am also thankful to all people who contributed to improve early versions of the chapters of my dissertation: Dr. Andrew Noble, Dr. Tran Duc Vien, Prof. Michael Stocking and two anonymous reviewers for Chapter 4; Chapter 5 received useful comments during the Ph.D.

School "The Challenge of Self-Governance in Complex, Globalizing Economies: Responding to Walter Eucken's Challenge", 17-26 April 2007 in Freiburg, Germany from all participants, particularly Louisa Evans, Adam Henry and Barry Ferguson; Dr. Meredith Williams and Dr Corinne Mulley for Chapter 5; Georgina Houghton, Dr. To Xuan Phuc, Dr. Nguyen Quang Tan and two anonymous reviewers for Chapter 6.

Thanks to the new friends I met during the course of my research for being there, I am glad our roads have crossed each other's. Thank you Amandine, Anne, Coralie, Johann, Julia and Sabine for your friendship. A special thanks to Seb and Jill, Yasmine and Mimi for being such nice friends up here in Newcastle and supporting me so much during my dissertation writing.

Thanks to my family and particularly my parents for giving me so much love.

List of abbreviations used

5MHRP	Five Million Hectares Reforestation Programme
ADB	Asian Development Bank
AIC	Akaike Information Criterion
ANOVA	Analysis of Variance
CBFM	Community-Based Forest Management
CBNRM	Community-Based Natural Resource Management
CIFOR	Centre for International Forestry Research
CLUWRR	Centre of Land Use and Water Resources Research (UK)
CPV	Communist Party of Vietnam
DARD	Department of Agriculture and Rural Development (Vietnam)
DONRE	Department of Natural Resources and Environment (Vietnam)
DN	Digital Number
DOS	Dark Object Subtraction
ETM+	Enhanced Thematic Mapper Plus
FAO	Food and Agriculture Organisation of the United Nations
FIPI	Forest Inventory and Planning Institute (Vietnam)
FLA	Forestry Land Allocation
FPD	Forest Protection Department (Vietnam)
FSIV	Forest Science Institute of Vietnam
FSSP	Forest Sector and Support Partnership (Vietnam)
GDLA	General Department of Land Administration (Vietnam)
GIS	Geographic Information System
GoV	Government of Vietnam
GR	Global Regression
GSO	General Statistics Office (Vietnam)
GWR	Geographically Weighted Regression
GTZ	*Gesellschaft für Technische Zusammenarbeit* (Germany)
IAD framework	Institutional Analysis and Development framework
IRD	Institute of Research for Development (France)
IPSARD	Institute of Policy and Strategies for Agriculture and Rural Development (Vietnam)
IR	Importance Ranking
IWMI	International Water Management Institute

Lao PDR	Lao People's Democratic Republic
LUCC	Land-use and Land-Cover Change
MARD	Ministry of Agriculture and Rural Development (Vietnam)
MAUP	Modified Areal Unit Problem
MOJ	Ministry of Justice (Vietnam)
M&E	Monitoring and Evaluation
MBPF	Management Board for Protection Forest (Vietnam)
MBSF	Management Board for Special-use Forest (Vietnam)
MONRE	Ministry of Natural Resources and Environment (Vietnam)
MSEC	Management of Soil Erosion Consortium
NA	National Assembly (Vietnam)
NDVI	Normalised Difference Vegetation Index
NFS	National Forestry Development Strategy
NGOs	Non-Governmental Organisations
NMR	Northern Mountain Region (Vietnam)
NRM	Natural Resource Management
NTFP	Non-Timber Forest Product
ODA	Overseas Development Assistance
ODI	Overseas Development Institute (UK)
PPC	Provincial People's Committee
RAPID	Research and Policy in Development
RIs	Research Institutes
SFE	State Forestry Enterprise
SFRI	Soil and Fertiliser Research Institute (Vietnam)
THED	Theory of Himalayan Environmental Crisis
TM	Thematic Mapper
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USD	US dollar
VAAS	Vietnam Academy of Agricultural Sciences
VND	Vietnamese dong (USD 1 approximately equals to 16,500 VND – exchange rate in May 2008)

List of key definitions used

Actor: Individual or group of individuals who can take decisions and actions.

Action arena: Conceptual unit composed of the action situation and the actors in that situation. It is the "social space where actors with diverse preferences interact" (e.g. exchange goods and services or solve problems) (E. Ostrom, 1999, p. 42).

Action situation: Conceptual unit, characterised by the following variables: "(1) participants, (2) positions, (3) outcomes, (4) action-outcome linkages, (5) the control that participants exercise, (6) information, and (7) the costs and benefits assigned to outcomes" (E. Ostrom, 1999, p. 42).

Administrative decentralisation (also called deconcentration): Any act in which a central government devolves power to its appointees (Agrawal and Ribot, 2000).

Afforestation: "Planting of trees on land that was not previously forested" (FAO, 2005, p. xiv).

Agricultural land: "The land designated primarily for use in agricultural production such as cultivation, animal husbandry, aquaculture, or experimental research on agriculture" (National Assembly of Vietnam, 1993, article 42).

Bare land (or degraded hills) (*Đồi núi trọc*): This term is used to describe forestry land with no plants/trees or with trees which do not yet meet the criteria to be classified as forest (MARD et al., 2003c, p. 13). It also corresponds to be the lowest level of classification of forest. Bare land is considered to lack the natural ability to regenerate so afforestation measures need to be taken to plant trees.

Belief: "Assent of the mind to a statement, or to the truth of a fact beyond observation, on the testimony of another, or to a fact or truth on the evidence of consciousness" (Oxford English Dictionary, 2008a).

Black box: Result of the social process of hiding the internal nature of a complex phenomenon by only considering its input and output (based upon Latour, 1987). Black-boxing a phenomenon entails taking its internal nature as immutable and unquestionable.

Bureaucracy: "Government officials collectively" (Oxford English Dictionary, 2008b).

Common-pool resource: "A natural or man-made resource from which it is difficult to exclude or limit users once the resource is provided by nature or produced by humans." (E. Ostrom, 2005, p. 79). They include for instance forests, grazing land or fisheries.

Community: There is no universally shared concept of community. In a generic sense, it is usually understood as a small spatial unit with a distinct social structure and a shared set of norms (Agrawal and Gibson, 2001). In the dissertation, the term "local community" refers to a village or group of households, whereas "policy community" refers to the group of actors who participate in policy-making.

Decentralisation: "Any act in which a central government formally cedes powers to actors and institutions at lower levels in a political administrative and territorial hierarchy" (Mawhood, 1983; Smith, 1985, in Agrawal and Ribot, 2000). See also in this section administrative, fiscal and political decentralisation and devolution.

Deforestation: Process when "forests are cleared by people and the land converted to other uses, such as agriculture or infrastructure" (FAO, 2005, p. xiv). The term "deforestation" is usually used when forest degradation reaches more than 90 per cent of the area considered (De Koninck, 1999).

Devolution: Devolution is described as "the increased empowerment of local organizations with no direct government affiliation" (Maniates, 1990). A broad definition of devolution including transfers to communities, households and individuals is used in the dissertation (which others might call "privatisation").

Discourse: "A specific ensemble of ideas, concepts, and categorizations that is produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1995, p. 60).

Fiscal decentralisation: "The decentralization of budgetary and revenue generating powers" (Dupar and Badenoch, 2002, p. 3).

Forest: "Land spanning more than 0.5 hectares with trees higher than 5 metres and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use" (FAO, 2005, p. 169). Forest is defined in the 1991 Forest Protection and Development Law as "the natural forest and plantation on forestry land, including forest vegetation, animal and the natural features relating to the forest" (National Assembly of Vietnam, 1991). This law classifies forest quality into the following categories: bare land, forest with small trees, poor forest, medium forest, rich forest.

Forestry land: "Land designated primarily for use in silviculture production, including land with natural forest, land under afforestation, and land used for forestry purposes such as afforestation, forest nursery, protection for natural rehabilitation, forest enrichment and experimental research on silviculture" (National Assembly of Vietnam, 1993, Article 43).

Institutions: "The prescriptions that humans use to organize all forms of repetitive and structured interaction including those within families, neighborhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales." (E. Ostrom, 2005, p. 3).

Land cover: Biophysical cover of the land surface.

Land use: Human activity on land.

Level: Unit of spatial or temporal resolution.

Narrative: A story with a beginning, middle and end (Roe, 1991). A development narrative is a story "that underwrite and stabilize the assumptions for decision making in situations of high complexity and uncertainty" (Roe, 1999, p. 13).

Norms: "Shared prescriptions that tend to be enforced by the participants themselves through internally and externally imposed costs and inducements" (E. Ostrom, 1999, p. 37)

Policy-maker: Actor or group of actors whose actions affect policy design and implementation. It includes e.g. government staff, bilateral and multilateral donors, advocacy Non-Governmental Organisations and researchers.

Political decentralisation (also called democratic decentralisation): Any act in which a central government devolves to actors or institutions that are accountable to the population in their jurisdiction (Agrawal and Ribot, 2000).

Public goods: Non-excludable goods that yield non-substractive benefits. These include for instance government services such as defense, or the maintenance of law and order.

Reforestation: Process when "Part of a forest is cut down but replanted" (FAO, 2005, p. xiv)

Rules: "Shared prescriptions (must, must not or may) that are mutually understood and predictably enforced in particular situations by agents responsible for monitoring conduct and for imposing sanctions" (E. Ostrom, 1999, p. 37).

Scale: Extent of the study area or duration of the observation.

Story-line: "A generative sort of narrative that allows actors to draw upon various discursive categories to give meaning to specific physical or social phenomena" (Hajer, 1995, p. 56).

Strategies: "Regularised plans that individuals make within the structure of incentives produced by rules, norms and expectations of the likely behaviours of others in a situation affected by relevant physical and material conditions" (E. Ostrom, 1999, p. 37).

Unused land: "Land lacking sufficient conditions or not yet designated for the purpose of agriculture, aquaculture and forestry production, not yet designated as land for rural residential, urban, or other specialised purposes, or not yet allocated by the State to any organisation, household or individual for stable and long term use" (National Assembly of Vietnam, 1993, Article 72).

Waste land (*Đất hoang*): Also sometimes called open land. Waste land was considered by the General Department of Land Administration (GDLA) as unused land (MARD et al., 2003a, p. 38), i.e. not yet owned or managed. Waste land and bare land are the primary targets of afforestation projects (MARD et al., 2003b, p. 4).

Chapter 1. Afforestation policies in the world: an issue of concern?

"*Rừng là vàng, nếu mình biết bảo vệ, xây dựng thì rừng rất quý.*"
(Forests are gold, if we know how to protect and develop them, they will be truly precious)
Ho Chi Minh, First President of the Socialist Republic of Vietnam (1946–1969), 1962

"Reforestation is essential to restoring the Earth's health."
Lester R. Brown, president of the Earth Policy Institute (2001, p. 183)

I. A growing momentum for forests

Every people, communities, business and industry, civil society organisations and governments worldwide have been recently invited to plant trees. The United Nations Environment Programme (UNEP) launched in 2007 a worldwide campaign called "Plant for the Planet: Billion Tree Campaign" to plant a billion trees each year throughout the world. Afforestation has indeed emerged as an issue that should concern every human being in the world, no matter its ethnicity, culture, location or subsistence means.

The issue of forests has been set high on the international policy debates over the past twenty years. In 1985, the Tropical Forestry Action Plan, an international framework for the development of national forestry action plans, was issued by the Food and Agriculture Organisation of the United Nations (FAO) in collaboration with the World Bank, the United Nations Development Programme (UNDP) and the World Resources Institute in response to what was labelled "an alarming situation" regarding tropical forests (FAO, 1985). At the United Nations Conference on Environment and Development held in 1992 in Rio de Janeiro, sustainable forest management emerged as one of the most contentious issues on the agenda with highly polarised debates between developing and developed countries. In spite of intense negotiations, governments did not reach a consensus for a legally binding agreement on forest management. Instead, debates were summarised into a statement known as the "Forest Principles" and the Chapter 11 of Agenda 21: "Combating Deforestation". Following this first major milestone in the international policy debate on forests, seven years of discussion elapsed before all United Nations Member States finally agreed on a non-legally binding agreement on forests (ECOSOC, 2007), aiming at developing international cooperation and national action to halt deforestation, reduce land degradation and improve livelihoods of forest-dependent people.

Nevertheless, the governments of many developing countries (e.g. Brazil, Chile, China, India, Nepal, Philippines and Vietnam) have not waited for this agreement to initiate large afforestation campaigns with the support of multilateral and bilateral donors. The central government of China has allotted 1.7 billion US dollars (USD) in subsidies for fast-growing plantations to be distributed by 2015 (American Forest & Paper Association, 2004). In Vietnam, large-scale national tree planting initiatives have been implemented since the 1990s and international organisations have committed more than 200 million USD for national forest sector development between 2006 and 2010 (Vietnam News Source, 2005). At the same time, there has been an increasing recognition of the importance of the institutions governing access and use of forest and land in forest restoration. In parallel to forest rehabilitation projects, governments have often implemented institutional reforms including land classification, privatisation and decentralisation policies (e.g. in Vietnam, China, Indonesia, India) (Dupar and Badenoch, 2002). One of the major stated aims of decentralisation policies, which have ranged from co-management to fiscal, administrative and political decentralisation[1], has been to protect forest and to improve forest and land management.

This universal interest in forests is rooted in many policy agendas. Prominently featured in the policy and public debates is the concern over the multiple environmental consequences of deforestation. Forest loss has been linked with desertification and soil erosion (UN, 1987, p. 46; UNCED, 1992, p. 233), large-scale floods (UN, 1987, p. 22; Brown, 2001), watershed degradation (UN, 1987, p. 130) and biodiversity loss (UN, 1987, p. 46). The need to mitigate and adapt to climate change has reinforced the necessity to conserve what has been labelled "the lungs of the earth". Deforestation has been identified as a major factor responsible for carbon emission and halting deforestation or afforesting/reforesting a key mitigation for carbon removal during the last decade (Cairns and Lasserre, 2004; Nabuurs *et al.*, 2007). In addition, the provision of carbon sequestering credits for afforestation projects under the Clean Development Mechanism (Article 12 of the Kyoto Protocol) has received growing attention from developing countries (Rudel, 2008). Recently, bio-energy plantations have become

[1] These terms are defined in the Definition Section.

increasingly attractive as an alternative source of fuel (Carter *et al.*, 2007). Lastly, although less covered in the media, economic stakes related to timber exploitation have been particularly high in a global context of growing demand for timber, paper and other industrial products (Lang, 1996; Rudel, 2008).

II. Rationale for the research

II.1. Afforestation campaigns

II.1.1. Afforestation: an environmental panacea?

Afforestation campaigns imply extensive land-use change with a potentially high impact on the environment. Recent state plans for afforestation have covered 8.6 million ha in China (Weyerhaeuser *et al.*, 2005), 1.4 million ha in the Philippines (Chokkalingam *et al.*, 2006), and 5.0 million ha in Vietnam (De Jong *et al.*, 2006a). The 1988 National Forest Policy of India has planned bringing at least one-third of the country area under forest cover (Balooni and Singh, 2007). The establishment of tree plantations has been considered by a majority of governments and international organisations worldwide as unquestionably beneficial for the environment (Forsyth, 2003). However, hydrologists have challenged many taken-for-granted assumptions on the universal hydrological benefits of forest. For example, there is a scientific consensus that forests neither increase rainfall, nor prevent large-scale floods (their protective role against flooding being effective only in small catchments: Calder, 1998; 2005). But, more importantly, the establishment of tree plantations, and especially of fast-growing evergreen species, might result in a range of adverse environmental impacts.

Firstly, tree plantations seriously affect watershed water balance, reducing annual water surface runoff compared to other land covers such as grass and annual crops (Calder, 1998; Bonell and Bruijnzeel, 2005; Calder, 2005; Jackson *et al.*, 2005). Popular beliefs assume that forests act as sponges, regulating water flows by keeping water in the soil during wet seasons and slowly releasing it during dry seasons. However, empirical research has indicated that this representation is a gross and inaccurate simplification of actual hydrological mechanisms. The impact of afforestation on dry season flows is highly site specific. Depending on soil and vegetation properties, afforestation might either increase or reduce dry season flows (Calder, 1998; Walker, 2002; Calder, 2005). A recent cluster of related research projects on the association between vegetation and dry season flows recommends limiting afforestation, especially in dry countries where fast-growing evergreen tree species are concerned (University of Newcastle upon Tyne *et al.*, 2005).

Secondly, several studies worldwide have observed that eucalyptus and pine plantations might have adverse effects on soil fertility, by decreasing soil pH (Jaiyeoba, 1998; Jackson *et al.*, 2005). Thirdly, the establishment of monoculture plantations is likely to lead to reduced agro-biodiversity because of landscape homogenisation and to the destruction of semi-natural corridors provided by agricultural practices which enabled wildlife migration (Sowerwine, 2004; Weyerhaeuser *et al.*, 2005). Lastly, forestry-related activities such as drainage, road construction, road use and felling also have environmental negative impacts such as erosion (which rates might far exceed erosion rates from annual cropping).

II.1.2. Social and political impacts of state forest rehabilitation programmes

Afforestation is not only an environmental issue, but also a social and political issue. It can threaten food security as land reforested or kept for afforestation is not available for subsistence crop cultivation. What is more, state afforestation programmes can modify the distribution of power among several groups of actors (e.g. poor farmers, local elite, state forest enterprises, state professional departments, private logging companies) by changing the rules related to land ownership, access and use. Concerns over the actual access and benefits to the rural population are particularly acute in the presence of strong economic stakes associated with the extraction, exploitation and commercialisation of wood products (Ribot and Larson, 2007). Several studies have challenged the success of state-led afforestation campaigns in reducing poverty and improving livelihoods (Weyerhaeuser *et al.*, 2005; Jiang, 2006).

II.2. Pitfalls of past and current institutional reforms

II.2.1. Devolution of forest and land management: an institutional panacea?

Governments' commitment to the decentralisation of natural resource management (NRM) has generally been touted by the international community as a major step towards more effective, equitable and sustainable resource management. However, an increasing body of research has questioned the actual benefits of these decentralisation policies, including decentralisation initiatives to local authorities and to communities (Jiang, 2006; Ribot *et al.*, 2006; Tacconi, 2007). There has been a gap between their theoretical promises and implementation in practice, because of a variety of factors, including local government corruption, the lack of accountability of government agencies to the local population or the little actual power and responsibility devolved to local authorities (Shackleton *et al.*, 2002; Ribot, 2004).

Furthermore, scholars have outlined that the rights devolved to the local population do not necessarily mean the ability to derive access and benefits to resources (Ribot and Peluso, 2003). In many instances, the implementation of Community-Based Forest Management (CBFM) has failed to lead to more effective and equitable management and to achieve its pro-poor objectives (Ribot, 2002; Blaikie, 2006). *In fine*, local populations have hardly enjoyed the economic benefits of the decentralisation of forest management (Ribot *et al.*, 2006). There is a growing consensus that decentralisation is no more a political panacea than afforestation is an environmental panacea. Particularly, its outcomes are highly dependent on the motives of central governments to devolve responsibilities to lower levels (Agrawal and Ostrom, 2001; Ribot and Larson, 2007).

II.2.2. From common to Individual property regimes

The allocation of land to local people for forest rehabilitation has modified the type of property regime governing forest and land management. In South and South-East Asia, areas targeted for forest rehabilitation are mostly mountainous regions, lowlands being reserved for agricultural production and the development of industries and services. Forest and land in these areas have been traditionally managed under common-property regimes by the local population (Rerkasem and Rerkasem, 1995). Even when land was nationalised under colonial regimes, customary collective arrangements were often *de facto* tolerated as a result of a lack of state control. The allocation of forest and land to individuals, households and the private sector has imposed a new resource management regime based on individual property. Although many advantages have been attributed to individual property regimes by economists (e.g. efficient and sustainable use of resources and efficient use of capital by lowering transaction costs), these theoretical claims have proved to be limited in practice because of incomplete property rights or factors leading to overexploitation of the resource (e.g. profit maximisation, long-term time horizons, or uncertainty: Acheson, 2006). Furthermore, several characteristics of the upland socio-ecological systems suggest that a common-property regime might be more appropriate (McKean, 2000). For instance, the administrative support to enforce rules related to an individual property regime in large and inaccessible areas is often insufficient (e.g. a large court system to enforce individual land titles). Shifting cultivation systems based on collective arrangements are also particularly well-suited to the inherent low soil fertility which prevails in the upland areas of Asia (Sharma and Kerkhoff, 2006).

II.3. The need to develop analyses of the success and failure of forest policies

In the field of forest policy, there has often been a gap between rhetoric, intentions and observed results in the field (Blaikie and Springate-Baginski, 2007; Grainger and Konteh, 2007; Ribot and Larson, 2007). Despite the potentially high social and environmental impacts of recent forest policies, little research effort has been devoted to the study of their impact on farmers' decisions over land use and management (Rudel, 2008). It is precisely this research gap that this study proposes to address.

Vietnam provides a remarkable case study in this respect. Its government has implemented since the early 1990s a series of state initiatives aiming at afforesting and protecting existing forest. These policies have been articulated around three main tenets: stopping shifting cultivation, devolving forest management to households and planting trees through afforestation campaigns. To the eyes of an outsider, these policies appear to be relatively successful (Mather, 2007). With a rise in forest cover from 28 per cent in 1990 (Prime Minister of the Government of Vietnam, 2007b) to 38 per cent in 2006[2] (GSO, 2006), Vietnam stands out in the last Global Forest Resources Assessment as one of the few countries in the world where forest cover has increased more than 0.5 per cent per year between 2000 and 2005 (FAO, 2005). Yet several studies have questioned the actual contribution of forest policies to environmental protection, sustainable land management and livelihoods (Bass and Morrison, 1994; Dinh Duc Thuan, 2005; Sunderlin and Huynh Thu Ba, 2005; Muller *et al.*, 2006). Whereas economic growth in the lowland areas has been impressive, poverty and vulnerability still prevail in the upland areas targeted by state forest policies (Zingerli, 2003; Minot *et al.*, 2006). This study aims to make an original contribution to existing

[2] Figures on forest cover area in Vietnam are actually controversial and some observers refute substantial reforestation in Vietnam (Sunderlin and Huynh Thu Ba, 2005).

research by investigating whether afforestation in Vietnam is indeed a success story and analysing the roots of possible policy failures.

III. Scope, aims and objectives of this study

The scope of this study is the design, implementation and impacts of two recent sets of policies: the current national state-led afforestation programme, the Five Million Hectares Reforestation Programme (5MHRP), and the allocation of land property rights to households and communities. The study is geographically restricted to the northern uplands of Vietnam, because of the research context in which it has been grounded (see the Research Context Section IV in this chapter). The temporal scale considered fitted approximately with the extent of the implementation of the two policies considered, i.e. from the 1990s until the date of completion of this study (2008). These sets of policy decisions are particularly significant in Vietnam in regard to their potential impact on sustainable land management and livelihoods. They are also remarkable by their spatial and temporal extent: they have been implemented in every administrative unit and have undergone an average ten-year implementation phase. Lastly, they are important in regard to the high costs they have incurred for the state budget.

However, very little information is available on the results of the 5MHRP, considered to be one of the cornerstones of the national forestry policy, and its actual impacts on farmers' land-use decisions. In addition, whereas some local research studies have documented the impact of forestry land allocation (FLA) on forest and land management at the community level (Dinh Duc Thuan, 2005; Castella *et al.*, 2006; Nguyen Quang Tan, 2006a; Jakobsen *et al.*, 2007; Sikor and Tran Ngoc Thanh, 2007), few attempts have been made to investigate the drivers for observed outcomes beyond the local level.

The research goal is to assess whether these two sets of policies have fulfilled their objectives regarding improved land management and afforestation, and if not, understand the roots of the gap between stated policy intentions and outcomes. This multi-layered analysis has revolved around three particular issues of concern: (1) linking farmers' decisions over land use and management with local, meso- and macro-level incentives, and particularly state policies; (2) understanding how central policy decisions have been actually translated into a range of incentives and constraints for farmers throughout their implementation; and (3) analysing the rationale for central policy decisions and relating it to observed policy outcomes. Policy impacts are assessed in regard to their stated objectives and the set of constraints and incentives on land use and management that they provided to farmers. Policy outcomes regarding farmers' livelihoods are discussed (**Chapters 4 and 6**) but are not the main focus of this study. The two distinguishable afforestation processes, natural regeneration and the establishment of trees, were considered in this study under a farmer's perspective, i.e. translated into the farmer's decision to cease cultivating the land or to plant trees.

The research goal has been divided into seven objectives:

1. Develop an original framework and methodology to understand how centrally designed state policies might affect the incentives and constraints that affect farmers' decisions over land use (**Chapter 2**);
2. Identify the actors and characterise the politico-economic context linked to forest and land management and the forestry sector in Vietnam (**Chapter 3**);
3. Understand how farmers' decisions over land use have been affected by upland allocation and afforestation campaigns in a given environmental, social and cultural context (**Chapter 4**);
4. Estimate actual forest-cover change in a province of Northern Vietnam. Evaluate the impact of meso-level factors on forest cover and assess its sensibility to local conditions (**Chapter 5**);
5. Identify the major outcomes of the two considered sets of policies at the regional level, link these outcomes with the policy decisions made by provincial authorities and explore the drivers for these decisions (**Chapter 6**);
6. Explore the range of factors that have affected policy design at the central level[3] and link policy-making decisions with policy outcomes observed at the provincial and local level (**Chapter 7**), and;
7. Design and disseminate relevant and appropriate policy recommendations (**Chapter 8**).

Besides the research goal previously mentioned, this study aims to develop knowledge and provide lessons contributing to the analysis and understanding of the

[3] Central level means the central level of government.

impact of forest policies in other parts of the world. Results should also be of interest to any scholar concerned with the assessment of state-led NRM policies.

IV. Research context

This study was integrated within an international research programme called Management of Soil Erosion Consortium (MSEC). MSEC was at its inception a component of the Asian Development Bank (ADB) supported project "Catchment Approach to Managing Soil Erosion in Asia" (ADB-RETA 5803). Coordinated by the International Water Management Institute (IWMI), it has been implemented in six South-East Asian countries including Vietnam. The objectives of the programme are to promote sustainable land management systems, evaluate the biophysical, environmental, and socioeconomic effects of soil erosion, and generate reliable information for the improvement of catchment management policies (Maglinao *et al.*, 2001). MSEC collaborating research institutes in Vietnam – the French Institute of Research for Development (IRD) and the Vietnamese Soil and Fertiliser Research Institute (SFRI) – have been collecting soil, hydrological, and land-use data in a 50 ha watershed in the northern uplands since 1999 (Tran Duc Toan *et al.*, 2003).

MSEC relies on a participatory, interdisciplinary and catchment-based approach in order to overcome the past shortcomings of conventional soil conservation techniques to halt erosion and land degradation in the South-East Asian uplands (Maglinao *et al.*, 2001). It advocates the use of hybrid knowledge and the consideration of social, political and institutional issues affecting farmers' decisions. Yet the programme has hitherto largely focused on the study of biophysical processes related to soil erosion, relying on an empiricist and positivist approach: "It focuses on the on- and off-site impacts of soil erosion, [...], and provides scientific data for rational decision making at all levels" (Maglinao *et al.*, 2001).

The MSEC programme defined for this study a collaborative research framework and delineated the area of fieldwork at the local level (the latter took place in the village and neighbouring villages where MSEC has been running). However, the IRD/SFRI permitted complete freedom to (1) define the focus of research and methodology and (2) develop fieldwork areas outside the MSEC case study site (e.g.

interviews with state agencies in other provinces and with policy-makers[4] in Hanoi (*Hà Nội*)).

MSEC objectives are based on the assumptions that (1) the land-use practices of farmers in South-East Asian uplands have become environmentally unsustainable (Maglinao *et al.*, 2001), (2) local people are not aware of this degradation, and/or (3) they do not know how to make their practices sustainable. A previous IWMI report stemming from MSEC research activities in Lao People's Democratic Republic (Lao PDR) strongly challenged some of these premises (Lestrelin *et al.*, 2004). This study consciously took a step back from MSEC research activities by broadening the topic's scope from soil erosion to the impact of state policies on land use and management, developing its own analytical framework and questioning the above-mentioned statements. Examination of the institutional and political issues related to land use and the social constructions of environmental processes (**Chapters 3 and 7**) allowed the assessment of the relevance of MSEC assumptions in the Vietnamese context.

V. Overview of the work

This study attempts to link the decisions of farmers with policies designed by central policy-makers. It examines the decisions of actors at multiple social and administrative levels[5], starting from households and communities up to provincial government bodies and central policy-makers. Geographical scales at which these decisions have been considered also vary: household-level decisions were analysed at the scale of three villages; drivers for forest-cover change were assessed at the commune level at the provincial scale; decisions of provincial authorities were scrutinised on a regional scale, covering four provinces of the Northern Mountain Region (NMR) of Vietnam. Lastly, the study explored the interaction of central policy-makers and the design of national policies.

Multi-level and multi-scalarity are thus essential aspects of this work. The advantages of adopting a multi-scale perspective in geography have been increasingly recognised (Sayre, 2005). In this analysis, a multi-level approach was necessary not

[4] The term "Policy-makers" is used in a broad sense and includes all actors partipating in policy design (see Definition Section).

[5] In the dissertation, the terms "level" and "scale" are distinguished as proposed by Sayre (2005): "level" is the grain of analysis (unit of observation) and a unit of social organisation; "scale" is the extent of the study area / duration of the observation.

only to relate policy design at the central level with policy outcomes at the household level but also to generate distinct view angles. As in ecology, different spatial and temporal scales of analysis can lead to different interpretations in the analysis of social phenomena (Fairhead and Leach, 1998; Gibson *et al.*, 2000c; Sayre, 2005). A meaningful example is Gray's study of land degradation in Burkina Faso, where, the analysis of aerial photos and field-level observations led to two opposite conclusions regarding the presence of degraded land (1999). Scale sensitivity is also an issue of concern in quantitative analysis of spatial phenomena and is known as the Modifiable Areal Unit Problem (MAUP) (Openshaw, 1984).

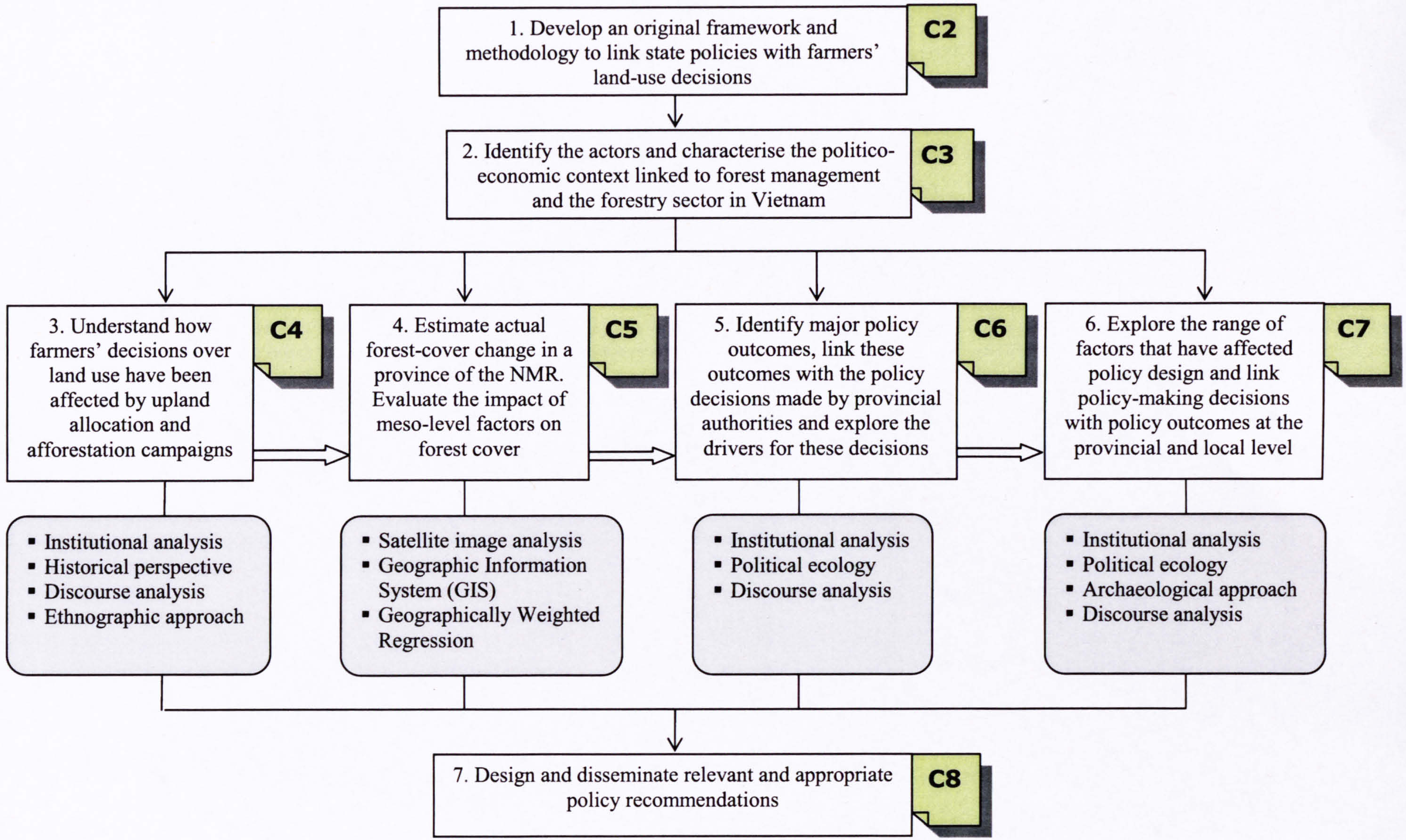
The second key characteristic of this study is its interdisciplinarity. Interdisciplinarity was essential as the problem considered is too broad to be adequately addressed by one single discipline. Using institutional analysis and more specifically the Institutional Analysis and Development (IAD) framework as its core structure, this study also heavily drew from political ecology in its methodological development and research focus. Namely a special attention was given to the social construction of environmental processes and the co-production of politics and scientific knowledge. In addition, the approach used quantitative tools of the land-use change research field e.g. remote sensing and spatial regression analysis. Interdisciplinarity also stimulates the interaction between different scales and levels of analysis. Equally important, it was aimed at bridging divides between social and natural researchers thereby increasing the relevance of the study to a wide audience.

In this regard, interdisciplinarity supported the third essential component of this research, which is its commitment to develop and disseminate sound policy recommendations. Since policies are at the heart of the study, it was natural to be concerned with communicating research results to policy-makers in order to guide future policy developments. This engagement was not only visible at the completion of the study when policy recommendations were produced and disseminated, but has been a concern throughout the whole research period. It guided the methodological development and strategic choices in conducting the research.

VI. Unrolling the dissertation

An overview of the structure of the thesis is shown in a flow diagram presenting the objectives and methods used by chapters (Figure 1-1).

Figure 1-1. Flow diagram of objectives, chapters (C) and methods used



Chapter 2 starts with a review of the state of the art of the methodological and theoretical research fields relevant to tackle similar issues, underlying their respective strengths and limitations. Lessons learnt from this reviewing exercise provided the basis to propose a methodological development of the IAD framework, combining institutional analysis with political ecology and methods from the land-use change research field.

Following this, **Chapter 3** outlines the basic characteristics of the analytical components of the study and their historical evolution: the biophysical conditions of the natural resource system, the attributes of the actors considered, the political system and the forest and land policies. The four next chapters are the analytical core of the thesis. Each of them constitutes a sub-component of the overall framework, located at a distinct spatial and governance level and relying on various analytical tools. Each of these chapters details the particular characteristics of the unit of analysis, the actors considered and the methodology adopted.

Chapter 4 presents the analysis of the land-use decisions of farmers' in three villages of Hoa Binh (*Hòa Bình*) Province, in Northern Vietnam, over the past decade and provides a first attempt to link farmers' decisions with state afforestation campaigns and FLA.

In **Chapter 5**, the spatial perspective is broadened. The contribution of macro-level ecological and social factors to forest-cover change is evaluated in Hoa Binh Province during a seven-year period. The relevance of various scenarios of deforestation and afforestation, designed from the results of the local level analysis, is discussed.

Chapter 6 focuses on understanding the discrepancies that have arisen between stated policy intentions and outcomes observed in Chapter 4. The policy decisions made by provincial administration are scrutinised, with an emphasis on the impact of centrally designed rules-in-use and discourses on policy implementation.

Finally, **Chapter 7** provides a critical analysis of the design of central policies and the formation of dominant discourses. This analysis informs the reader on the range of incentives and constraints that have shaped policy-makers' decisions and that have contributed to sustain false or biased representations of forest and uplands and explanations of environmental change.

The study is concluded in **Chapter 8** by a summary of the main findings and a discussion on the main lessons and contribution of the study. This chapter also introduces the set of policy recommendations elaborated from this research which was disseminated to policy-makers. Finally, directions for further research are proposed with the aim to progress and develop the understanding gained in this study.

Chapter 2. Methodologies and framework of enquiry

"... Problems of institutional analysis and development need to be addressed by modes of analysis that allow us to penetrate social reality rather than distance ourselves from that reality"
V. Ostrom *et al.* (1993, pp. 462-463)

I. What are the challenges ?

The objectives of this research, outlined in Chapter 1, can be synthesised in identifying the drivers for the decisions of multiple actors (farmers, provincial authorities, central government, international organisations) over (1) forest and land use and management, and (2) the design and implementation of the rules governing access, use and management of forest and land in Northern Vietnam. In particular this study aims at identifying the relative role of policies over farmers' land-use decisions.

There is not a single theory or discipline that can simultaneously address these issues. Such a study requires an interdisciplinary approach and a set of theoretical, analytical and methodological tools which can bring distinct and complementary insights into the issue of concern. There is a risk that methodological eclecticism results in theoretical contradictions and undermines the analytical and explanatory power of a research study; however, the overall approach presently adopted is not a supra-theory which pretends embracing and reconciling distinct theories. Rather, the general framework that was developed is compatible with a range of pertinent disciplines and theories and however still holds great analytical power.

These issues are addressed in this chapter. The next section presents an overview of how scholars have tackled similar problems related to the impact of policies on land use and management. Next, the ontological perspective and analytical framework adopted for this study are introduced. The framework is based on Ostrom's IAD framework (Kiser and Ostrom, 1982; E. Ostrom *et al.*, 1994; 1999; 2005), enriched with theoretical perspectives and methodological tools from three research fields. The adaptations of the framework are discussed, focusing on (1) how and why these additions might improve its performance in analysing environmental policy processes; and (2) how the extended framework was used. Finally, the last sections present the ethical issues considered in the research and the method that was selected to design and disseminate policy recommendations.

In the quotation appearing at the beginning of this chapter, V. Ostrom *et al.* (1993) underlined the need for institutional analysts to deconstruct general terms that describe complex configurations of relationships, such as "state" or "society". Instead, they advised to "penetrate social reality", i.e. to acknowledge, observe and understand the complexity of these configurations through a thorough immersion and interaction with the object of study. However, the authors recognised at the same time the necessity for a conceptual and theoretical apparatus to be able to understand patterns of order and development in human societies. It is indeed a major challenge that face all studies of human societies, and refers to what a famous German economist, Eucken, called the Great Antinomy (1951): in an increasingly complex multi-scale and fast-evolving world, one needs to develop suitable analytical frameworks, theories or models to give sense to empirical research. However, Eucken warned that one can loose contact with the real world by addressing problems solely under theoretical and general approaches.

This challenge is all the more salient in my present attempt to link broad and general policies with micro-level actors' decisions. On the one hand, it is necessary to consider the everyday decisions that farmers have to make regarding land use. It requires what Eucken calls an individual-historical approach that locates farmers' decisions with the local and historical context within which they are made. Such a study has to be based on perception, intuition, synthesis and understanding (Eucken, 1951). On the other hand, these individual decisions need to be linked with political and institutional changes in an analytical framework from which general lessons can be drawn. This theorising stage rather requires reasoning and capacity of abstraction.

To this challenge is added the complexity of the configuration of relationships that this study addresses. Although scientific forestry discourses have simplified forest management by confining it to commercial timber production (Majid-Cooke, 1995; Bryant, 1998), forest and upland ecosystems are characterised by a high complexity and uncertainty. For instance, the rate and extent of forest cover change or forest environmental benefits are difficult to ascertain. Furthermore, although afforestation is presented in most public discourses as an environmental issue, it conveys high political and economic stakes, which are often not easily discernable because they are kept in the backstage. Forest and land management are composites of nature, politics and discourses, hybrids, to use Latour's term (1993); the study of forest and land policies thus needs to acknowledge and take into account this hybridity.

Finally, this analysis spans geographical, institutional and administrative scales. In the current global move towards NRM decentralisation, management of forest and land in Vietnam and worldwide has increasingly relied on multiple levels of governance. As further illustrated in **Chapter 6**, forest and land policies in Vietnam have been dramatically transformed throughout multiple levels before affecting final users. Their analysis thus requires a multi-level understanding of the social processes by which they are affected from design to execution.

A single discipline or methodological tool can difficultly address this complexity and multi-scalarity. Not surprisingly, the analysis of how policies affect NRM has been tackled by several bodies of literature rooted in diverse disciplines. The next section reviews the contribution and limitations of three important bodies, considered to be particularly relevant for this study.

II. Reviewing past research efforts

II.1. Land-use change research

Theoretical and technological developments in the field of land-use and land-cover change (LUCC) studies have contributed to improve our understanding of human-land interaction. Among major advances, they have allowed identifying primary drivers of land-use change and have given rise to a large number of models with high explanatory and predictive power (for a review see Irwin and Geoghegan, 2001; Agarwal *et al.*, 2002). These models encompass (1) spatially explicit non-economic models, such as cellular-automata (Parker *et al.*, 2003) or empirical models based on remotely sensed data (e.g. Serneels and Lambin, 2001); (2) non-spatially explicit economic models; and (3) spatially explicit economic models. Spatially explicit models take into account spatial non-stationarity; they include global regression models (e.g. Geoghegan *et al.*, 2001) and local models based on e.g. multi-level modelling (Overmars and Verburg, 2006) and Geographically Weighted Regression (GWR) (Fotheringham *et al.*, 1998; Fotheringham *et al.*, 2002). This last type of model will be further discussed in **Chapter 5**.

Under a LUCC modelling perspective, the study would be conceptualised as the analysis of a relationship between a dependent variable – land use in Vietnam's northern uplands – and two independent variables – state-led afforestation campaigns and FLA. However, such a representation is limited for several reasons.

1) It would be wrong to approximate policies as independent variables since they themselves might be affected by changes in land cover and land use. For instance, the adoption of afforestation campaigns and the implementation of FLA in Vietnam are directly related to accounts of decrease in forest cover. Moreover, the success of the implementation of afforestation programmes also depends on the existing repartition among tree plantations and other land uses and on their level of competition.

2) Whereas policies are rather easy to identify at the central level because they are embodied in legal documents, they are quite difficult to trace down to the level where land-use decisions are taken, as the discrepancies that arise between legally defined rules and actual practices are often kept hidden, especially in Vietnam (Scott *et al.*, 2006).

3) Because the impact of policies on land use often depends on a contemporaneous social, economic, institutional and environmental context, the interaction between these terms also needs to be considered (Young *et al.*, 2006).

4) The dependent variable hides a complex and diverse set of components. Land use is not merely a category related to the use of land. It is a human activity motivated by various interests and incentives, depending on the socio-ecological context. Motives to grow natural forest or crops or to collect medicinal plants are diverse. Furthermore, different land covers hold distinct biophysical attributes, which also affect land-use decisions (e.g. farmers might grow fruit trees only in areas they can control, because fruits are easily stolen). Thus one cannot simply apply similar assumptions regarding drivers for land-use change and land user's behaviour for all ecosystems (e.g. see Lambin *et al.*, 2001). Indeed, the bodies of research that have studied land-use change have been rooted in distinct theories depending on the characteristics of the natural resource considered (e.g. common-property theory for common-pool resources or

public goods, and economic theory[6] for agricultural and urban land under private property). Because the northern uplands of Vietnam are characterised by a high diversity of socio-ecological conditions (**Chapter 3**), LUCC statistical models alone might not be sufficient to tackle the issue considered in a satisfactory way.

As McCusker and Carr (2006) pointed out, scholars researching on LUCC have not explored in detail the social processes that drive the variables identified as proximate causes or underlying factors (Geist and Lambin, 2002) of land-use change. Their studies have examined which aggregations of social and economic driving forces, such as population density, access to roads or poverty, might particularly drive land-use change/patterns. Some have integrated individual household data (e.g. Evans *et al.*, 2001; Geoghegan *et al.*, 2001; Muller and Zeller, 2002) but most have selected *a priori* explanatory variables, based on assumptions drawn from social science theory. Few studies have actually attempted to investigate deeply the social reality and to answer the question why the observed factors are the driving forces of land-use change in one situation and not in another.

It is especially important to analyse social processes when decisions regarding land use do not only depend on one individual but also on norms and rules-in-use that are shared by several actors, as is frequent in the upland regions in Vietnam (**Chapters 3 and 4**). Indeed, with a few exceptions (e.g. Bray *et al.*, 2004; Manson, 2006), this whole field of literature has a commonality: its poor ability to understand land-use systems characterised by a high level of human interaction. One systematic attempt to characterise these social processes or human interaction has been that of institutional analysis (E. Ostrom, 2005). Whereas institutional aspects have been well-considered in the studies of forest management (E. Ostrom, 1990; Gibson *et al.*, 2000b), they have been frequently neglected in the LUCC literature. Of the 19 LUCC models that Agarwal *et al.* (2002) reviewed, most showed no or little consideration of institutional factors.

[6] Influential economic models include for instance von Thünen, Ricardo and Alonso models.

II.2. Institutional analysis applied to NRM

II.2.1. Introducing institutional analysis

Institutional analysis can be defined as the study of institutional design and performance. Particularly, an institutional analyst is concerned with how institutions affect the incentives and deterrents that shape human behaviour. In this study "institutions" are defined as (E. Ostrom, 2005, p. 3): "... the prescriptions that humans use to organize all forms of repetitive and structured interaction including those within families, neighborhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales." Institutions are structured by rules-in-use, norms and strategies[7]. As in the new institutional economics literature, in this dissertation institutions are distinguished from organisations: institutions are the "rules of the games" (North, 1990, p. 3) whereas organisations are compared to the "players" who use the rules in a way to win the game (*ibid.*).

Institutional analysis covers a wide range of aspects of human society and has anchored itself in several disciplines, namely political science, anthropology, sociology and economics. It has notably been extensively applied and developed in the analysis of NRM to identify, understand and design rules enabling equitable, efficient and sustainable NRM, or more generally to study people-environment interactions (e.g. E. Ostrom, 1990; Thomson, 1992; Leach *et al.*, 1999; Committee on the Human Dimensions of Global Change *et al.*, 2002; Acheson, 2006; Meinzen-Dick, 2007; E. Ostrom, 2007). It has provided thorough insights on the conditions of success and failure of collective action to manage land, water, forest or fisheries within various combinations of rules-in-use, biophysical conditions and attributes of the communities (e.g. Lam, 1998; Sproule-Jones, 1999; Gibson *et al.*, 2000b; Acheson, 2006).

II.2.2. The IAD framework

Several institutional frameworks have been developed for the study of NRM. The most prominent ones include the IAD framework, the environmental entitlements framework (Leach *et al.*, 1999) and the sustainable rural livelihoods framework, which has been adapted recently as a basis for institutional analysis (Messer and Townsley, 2003). In the field of policy analysis, the IAD framework (Kiser and Ostrom, 1982; E. Ostrom *et al.*, 1994; E. Ostrom, 1999) stands out as one of the most distinguished and

[7] The definition of rules-in-use, norms and strategies is in the Definition Section.

tested frameworks (Imperial, 1999; Carlsson, 2000). Since the early 1980s, it has been extensively developed by E. Ostrom and her colleagues and has been applied to a wide range of institutional settings[8]. It has been particularly used as a basis for developing a theory of common-pool resource management and has been supported in this field by a strong record of empirical research and theoretical development (Thomson, 1992; E. Ostrom *et al.*, 1994; e.g. Thomson and Schoonmaker Freudenberger, 1997; Lam, 1998)[9].

The focal level of analysis (Figure 2-1) consists of an action arena, composed of actors located within action situations and affected by a set of external variables. Actors' interaction within action situations leads to outcomes, which feedback into the external variables and the action arena.

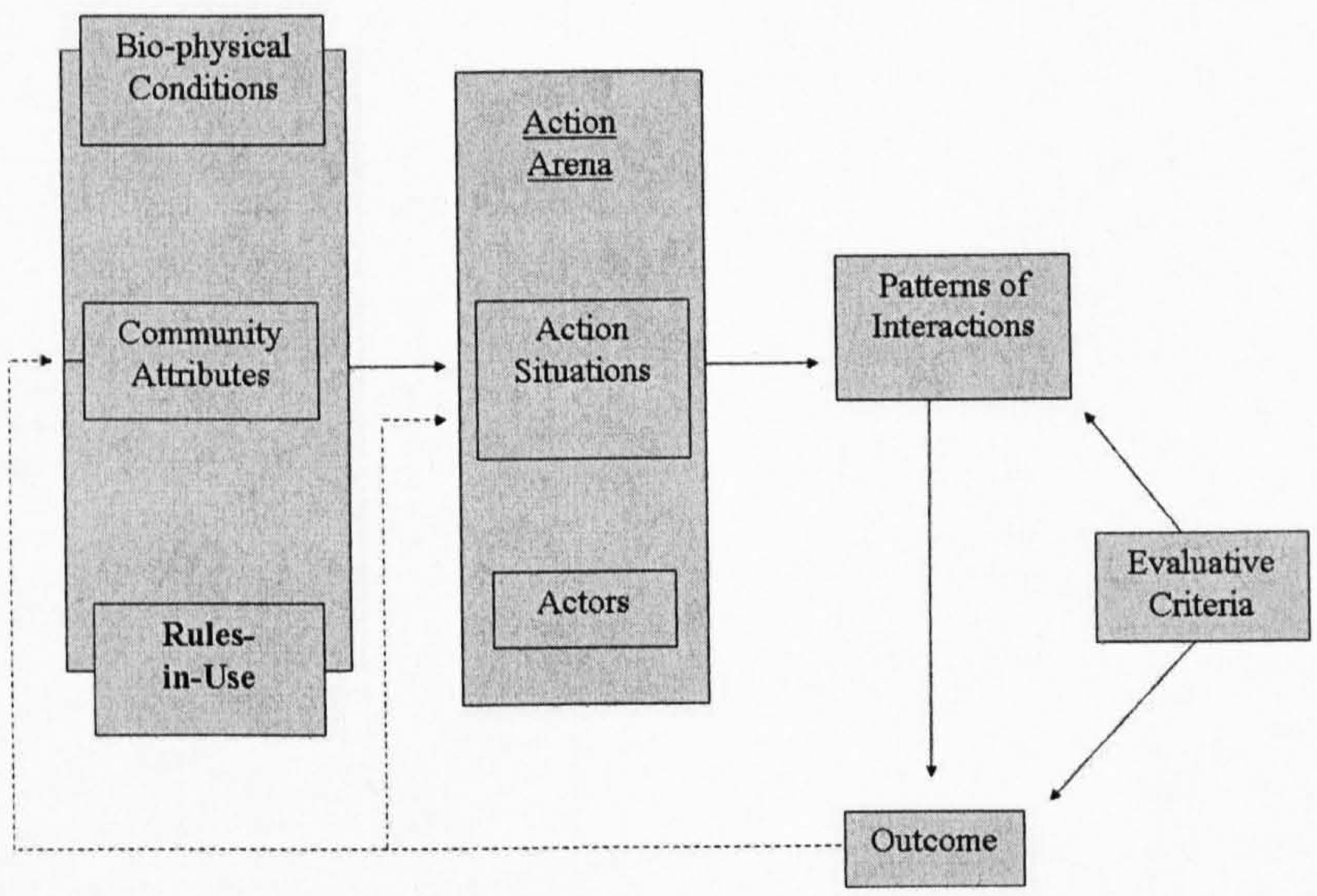


Figure 2-1. The focal level of analysis of the IAD framework
Source: Kiser and Ostrom, 1982; E. Ostrom *et al.*, 1994

The elements of the framework are conceived as holons. The concept of holon, first introduced by Koestler (1967) in his work on biological systems, designs a subassembly of a part-whole unit in complex adaptive systems (E. Ostrom, 2005). Each holon can be unpacked into sub-elements, allowing the analyst to explore more deeply the reality. The main holons are introduced in the following sub-sections.

---

[8] For a detailed description of the framework, the reader can refer to E. Ostrom's presentation of the IAD (1999; 2005).
[9] For more references on this topic, see E. Ostrom, 2005, p. 9.

The action arena: actors and action situation

The first task of the institutional analyst is to define the relevant action arena, which is the conceptual unit of observation and analysis, and determine the characteristics of its two holons: the actors and the action situation. The actors encompass individuals, groups of individuals or organisations, such as a community[10] or a local authority body. Actors are characterised by a set of four variables (Gibson *et al.*, 2005):

- the way they acquire, process, retain and use knowledge and information;
- the resources (e.g. human, financial) they can use;
- the intrinsic valuation they assign to outcomes (positive, e.g. under the form of joy, proud, or negative, e.g. under the form of guilt or shame); and
- the mental heuristics they use to select particular actions.

Many theories and models (notably the rational choice theory) have attempted to predict how these variables affect human behaviour. The action situation is very likely to affect individual's behaviour, e.g. participants will act differently in situations with high uncertainty or in highly competitive markets with full information on the action-outcome linkages (E. Ostrom, 2005).The analyst has to choose which model is the most adapted to represent actors' behaviour in regard with the situation considered.

The action situation (Figure 2-2) includes:

- the types of actions that actors are allowed to make;
- the definition of which actors can participate;
- the type of information and control do actors have over influencing the outcomes; and
- the costs and benefits assigned to actions and resulting outcomes.

The costs and benefits assigned to particular outcomes shape actors' incentives and deterrents. They can take the form a physical outcome and/or an external reward or sanction, which value depends on each participant (E. Ostrom, 2005).

---

[10] See the Definition Section for a definition of community.

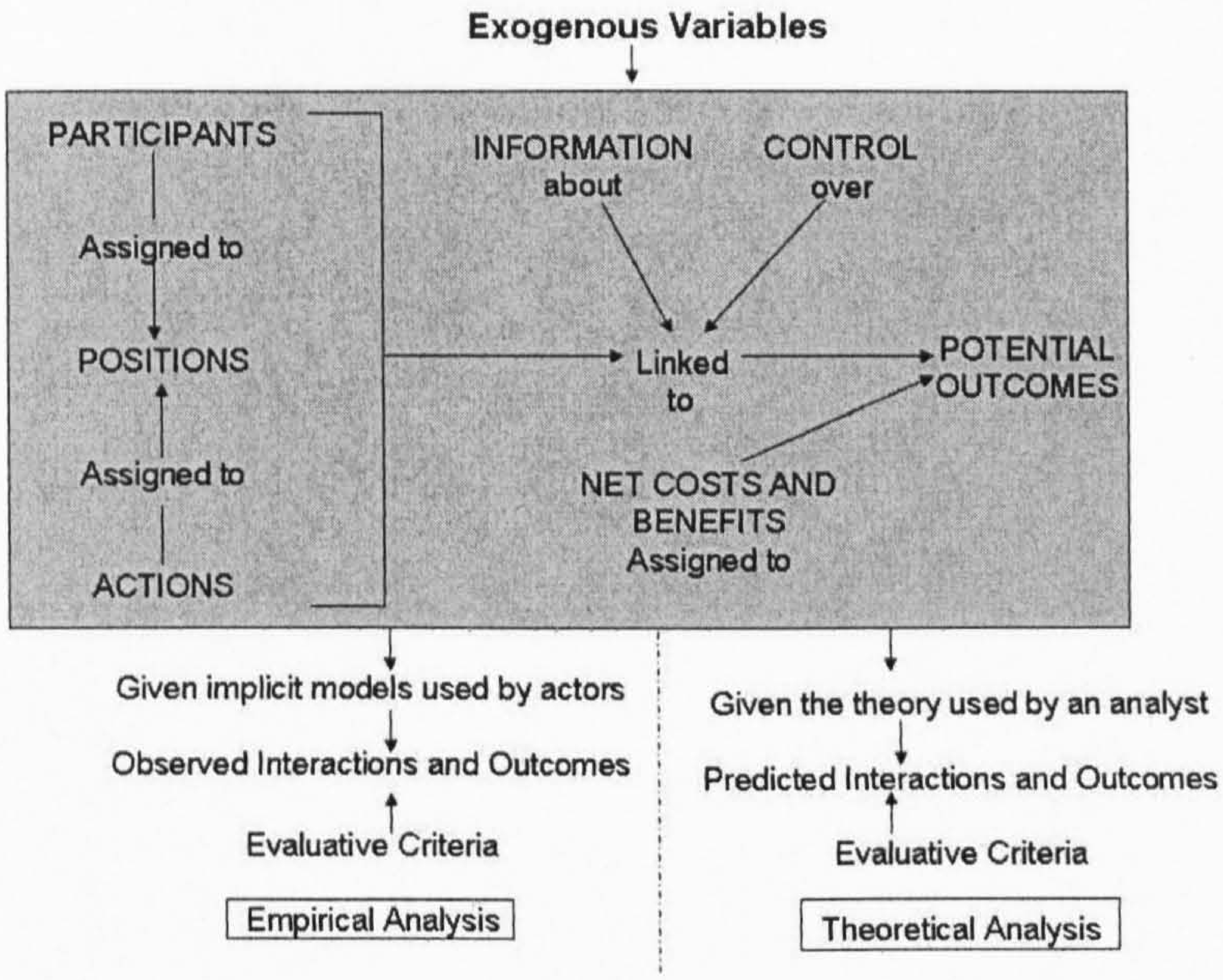


Figure 2-2. The action situation
Source: (E. Ostrom, 2005)

External variables

The external variables are the biophysical conditions (i.e. the physical state of the environment where actors evolve), the attributes of the community and the rules-in-use. How the biophysical conditions affect the action arena depends on several aspects, particularly on the substractability and exclusion of the resource (Box 2-1). Most natural resources such as grazing land, forests and lakes are common-pool resources, which are characterised by a high substractability and high exclusion costs. On the contrary, public goods have high exclusion costs but a low substractability: the consumption of a public good by one individual does not affect the amount available to others. The nature of the resource[11] or good considered is an essential factor for the design of appropriate institutional arrangements defining resource access and use (E. Ostrom *et al.*, 1994). Other attributes of the resources might greatly affect their use, e.g. their size, abundance, uncertainty (Wilson, 2002), resilience or vulnerability (E. Ostrom, 2007).

Box 2-1. Excludability and substractability

"Excludability relates to the difficulty of restricting those who benefit from the provision of a good or a service. Substractability refers to the extent to which one individual's use subtracts from the availability of a good or service for consumption by others" (E. Ostrom, 2005, p. 23). These attributes are commonly used to distinguish among private, public, toll goods and common-pool resources (see Definition section).

[11] The nature of resources, e.g. common-pool resources, is inherent to the resource itself and should not be counfused with the type of property regime, e.g. common-property regime, which defines the access and use of the resources.

The attributes of the community include various elements such as the level of trust within the community, their size (Olson, 1965; Agrawal and Goyal, 2001) or heterogeneity (Hong and Page, 2004).

Lastly, the rules-in-use are defined as the "shared understandings that refer to enforced prescriptions about what actions (or states of the world) are required, prohibited or permitted" (E. Ostrom, 1999 p. 50). They refer to all kinds of formal and informal prescriptions, e.g. legal documents issued by central governments, informal rules-in-use allowing provincial authorities to interpret these documents with relative freedom and collective rules-in-use orally shared within a community. E. Ostrom (1999) classified the rules into seven categories (position rules, boundary rules, choice rules, aggregation rules, information rules, payoff rules and scope rules), according to which element of the action situation they affect: for instance the choice rules define the possible actions that the participants under a specific position are required, permitted or prohibited to take, and the aggregation rules specify whether a decision requires to be controlled prior to the action.

Evaluative criteria

The evaluative criteria are an important element of the framework, as they enable the analyst to determine the performance of the institutional arrangement. The list of criteria depends on the particular interests and objectives of the analyst, but it usually includes efficiency, accountability, equity, adaptability and sustainability (E. Ostrom, 1999). A core assumption of the institutional analyst is that institutional change can affect these criteria. Thus, one can increase accountability by crafting new or revising old institutions.

Multi-level arrangement

A key characteristic of the IAD framework is its multi-level arrangement. It is structured from the operational level, where day-to-day decisions directly affect natural resources, to the collective-choice level, where decisions affect the rules at the operational level (Figure 2-3). The collective-choice level is finally linked to the constitutional level, where decisions affect the rules that govern how decisions are taken at the collective-choice level.

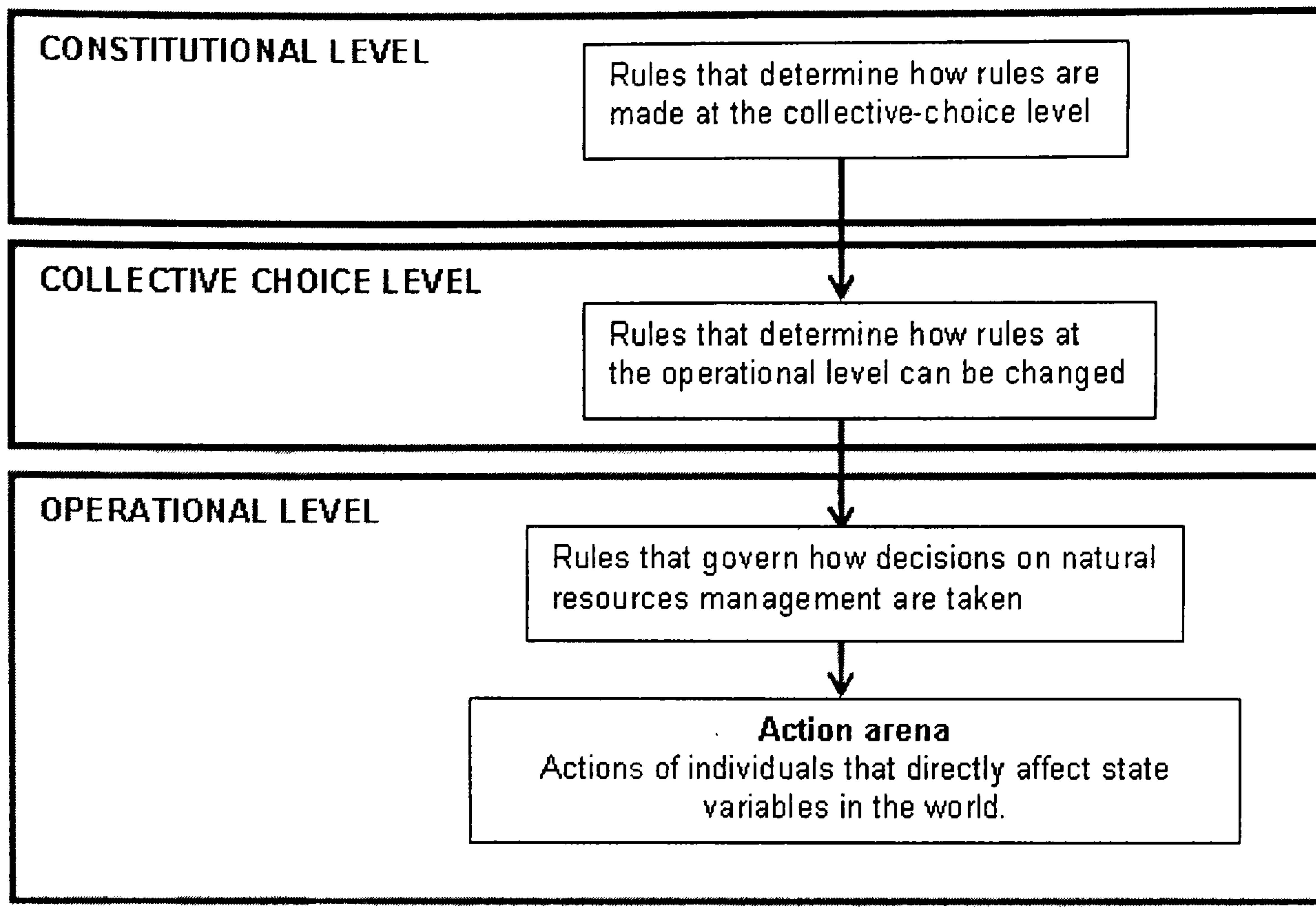


Figure 2-3. The three levels of analysis in the IAD framework
Source: Ostrom 1999

Table 2-1 presents several examples of the three types of institutional situations related to the two sets of forest policies considered in this study.

Table 2-1. Examples of situations for several institutional levels related to the 5MHRP and FLA

Institutional level	Examples of situations
Operational level	Land use decisions; choice over the length of fallow period
Collective-choice level	The design of rules governing forest and land use, for instance: the design and implementation of land allocation policies or of benefit-sharing principles for forest management; the design and implementation of land classification; the design of collective rules regulating land access by the local community
Constitutional level	The selection of the actors who will implement and enforce land allocation policies and the definition of their rights and responsibilities in policy implementation.

Source: this study

These institutional levels do not necessarily correspond to administrative levels. For instance, local communities can operate at the collective-choice or even at the constitutional levels when crafting their own rules or deciding on rule-crafting modalities.

II.2.3. Contributions and limitations of institutional analysis to the study of NRM

Institutional analysis has formed a basis for a theory of common-pool resources, which has notably challenged Hardin's "Tragedy of the Commons". Hardin (1968) predicted the over-exploitation of common-pool resources when the resource is relatively scarce and managed by a relatively large number of users, and when no external rules impose guidelines for their management. This rationale has greatly influenced privatisation or nationalisation of natural resources worldwide. Common-property theory defends that over-exploitation is not inevitable, notably if adequate collective rules on how to manage the resource have been crafted and shared by local users[12], and if local users can communicate effectively (E. Ostrom, 2007). This branch of research has emphasised the ability of local communities to manage natural resources without the intervention of the State and has often defended that NRM should be carried out at the lowest competent level of governance (subsidiarity principle[13]). The IAD framework has been applied extensively to study common-property regimes for many types of resources in many regions of the world (E. Ostrom, 1999). It has notably advanced the understanding of key rules improving the performance of NRM (Thomson, 1992; Lam, 1998). A growing field of application of institutional analysis in NRM has indeed particularly examined human ability to create and maintain self-governing sustainable socio-ecological systems (Janssen and Ostrom, 2006). It has opened a whole interdisciplinary area of study, combining laboratory experiments, use of remotely sensed data, and biophysical and social ground data (e.g. Schweik, 2000; Ostrom and Nagendra, 2006; Tucker *et al.*, 2007).

However, some critics have stressed that common-property theory is apolitical. They have blamed its focus on local rules and its overlook of the underlying socio-economic historical change and of distant political forces (Robbins, 2003, 2004). In particular, some scholars have argued that capitalist economies are responsible for the appropriation of communal capital away from locals, leading to land degradation and community disempowerment, issues which cannot be resolved by rule-crafting within the community (Muldavin, 1996). They have defended a political theory of the

---

[12] This notably depends on the level of trust – or the possibility of building trust through repetitive interaction – among members of the community and on the authority let to the community to build and apply its own rules.

[13] The subsidiarity principle claims that: "powers or tasks should rest with the lower-level subunits unless allocating them to a higher-level central unit would ensure higher comparative efficiency or effectiveness in achieving them" (Føllesdal, 1998, p.190).

commons, arguing that local outcomes depend on multiple levels of power and on the structure of the economy. This concern has formed a foundation for the emergence and development of an influential body of theories, labelled thereafter power-centred approaches.

II.3. Power-centred approaches

II.3.1. Political ecology

Political ecology has arisen as a major field of study of human-environment relations. It encompasses a wide range of approaches and methodologies (for a review and history, read Peet and Watts, 1996a; Robbins, 2004; Neumann, 2005), borrowed from cultural ecology, political economy, non-equilibrium ecology, and common-property theory (this methodological eclecticism being also a recurrent criticism of this field (Batterbury, 1999; Robbins, 2004)).

Originally rooted in cultural ecology studies representing communities as self-regulating and adaptative systems, it formed as a distinct branch of research in the 1970s under a neo-Marxist-influence. Reacting to neo-Malthusian writings, it has investigated the influence of state and society on the exploitation of natural resources (Blaikie, 1985). It has stood up against an "apolitical ecology", arguing that environmental change is the product of political processes and that technical explanations of – and solutions to – environmental degradation are not sufficient to effectively address environmental problems.

Political ecology has first aimed at linking environmental change with political economy (Blaikie and Brookfield, 1987). It has followed the materialist (Box 2-2) view that environmental change results from existing political, economic and social inequities, framed by the political-economic structure (Blaikie, 1985; Bryant and Bailey, 1997). The structuralist strand (see Box 2-2) of political ecology gained prominence in the late 1980s and early 1990s and has been coupled with close examinations of environmental change grounded in biophysical data (e.g. Blaikie, 1985; Blaikie and Brookfield, 1987).

Since the 1990s, an important development of political ecology has departed from these original materialist and structuralist roots by exploring the micro-politics of local struggles over environmental resources and the social origins and constructions of environmental change. This development has given rise to the second major strand of the field. Constructivist and post-structuralist approaches (Box 2-2) in political ecology have provided fresh insights on the ways in which environmental knowledge and concepts of environmental change emerge and are interpreted, and more broadly, on how nature is socially constructed (Escobar, 1996; Fairhead and Leach, 1996; Peet and Watts, 1996b; Simitzis *et al.*, 1996).

Box 2-2. Materialism, structuralism, post-structuralism and constructivism

Materialism is the belief that human societies evolve because of material factors, and not because of human ideas and ideologies. More particularly, materialists view economic relations as the basic cause of social phenomena (Abercrombie *et al.*, 2000).
Structuralism is a sociological perspective based on the belief that society is prior to individuals. The term has also been used to affirm that there is a set of social structures that are unobservable but that generate observable phenomena (Abercrombie *et al.*, 2000).
Post-structuralism is a form of analysis that relies on the belief that we cannot apprehend reality without analysing language (Abercrombie *et al.*, 2000).
Constructivism is the belief that our representations of the biophysical reality is shaped at least in part by social influences, including the influence of language on our descriptions of nature, the historical influences of societies or individuals on explanations of environmental processes and the current cultural context within which environmental representations and explanations emerge (e.g. the idealised representation of nature as wild and virgin) (Forsyth, 2003). Constructivism is less radical than post-structuralism. It recognises that there is a systematic relationship between the mind and the reality (Gergen, 1999, p. 60).

This recent development of political ecology has namely examined through discursive analysis how environmental claims are rooted in the political-economic system that produces and sustains them (Adger *et al.*, 2001). A famous example is the narrative on land degradation in the Hindu Kush-Himalaya region which supported the Theory of Himalayan Environmental Crisis (THED) (Blaikie and Muldavin, 2004). The THED asserted that anthropogenic erosion due to backward practices of upland communities would result in an environmental catastrophe in the region. In the late 1980s, it became strongly questioned and in large part rejected by the scientific community. However, despite of new evidence dismissing the THED, the theory of environmental degradation has sustained in the regional discourses prevailing in policy-making arenas. Discourses have continued to legitimise policies aiming to retain the control of the State on land use and forest management in this highly politico-strategic region.

This line of enquiry has been furthered by studies on the relationships between science and politics (Stott and Sullivan, 2000; Forsyth, 2003; Blaikie and Muldavin, 2004). These studies have argued that many widespread – and often taken-for-granted – scientific explanations of environmental change are based on little sound science. Some become accepted "environmental orthodoxies" which guide policies on the basis of over-simplified, inaccurate and sometimes false accounts of human-environment relations (cf. Forsyth, 2003). For instance, Fairhead and Leach (1998) reported that forest losses had been exaggerated in Western Africa, because of shortcomings in past scientific assessments. Ecologists considered forest islands as the relics of past extensive forest cover and signs of degradation instead of signs of forest recovery related to sustainable farming practices. This misinterpretation of forest-cover change led to misguided policies, which have focused on halting deforestation through the establishment of reserves and buffer zones and the exclusion of local people from forest management (*ibid.*). Political ecologists call for a critical look at scientific knowledge notably by considering how social and political factors frame environmental science.

II.3.2. Decentralisation studies

Also of interest for this study is the body of literature which has focused on the impact of the decentralisation policies of NRM. Scholars who contributed to decentralisation studies do not necessarily identify themselves as political ecologists – at least many do not refer to political ecology in their work – but their approach is similar in several respects to political ecology. A common point is the attention to the political-economic context at multiple scales. This body of literature is of particular relevance for this study since it has focused on policy implementation and, more especially, on how decentralisation policies have been transformed into actual rights and practices. While these studies have addressed institutional design and looked at the role of institutions in political outcomes, many of their authors demarcate themselves from institutional analysts by placing power – rather than institutions – at the core of their analysis.

The concept of power encompasses several definitions. Social power has been described as the potential of an agent to influence a target (French and Raven, 1959). Lukes (2005) extends the pluralist view – where various groups with different interests openly compete or are in conflict – and the view of power expressed in "non decision-making" – i.e. power is not always manifested in decisions but rather lies in the control over decisions, even if the result is a non decision – to a third dimension of power. This "third view" of power manifests itself just by being: power shapes values, norms and preferences by its mere existence. This third dimension introduces a form of power as imagined by Foucault (1975), who argues that power is not the instrument of a dominant State, but rather is situated in the daily enforcement of social and political practices that is made through institutions. Undeniably, institutions and power are closely interrelated because institutions directly affect power distribution. For Searle, it is actually a major purpose of institutional design: "the essential role of human institutions and the purpose of having institutions is not to constrain people as such, but, rather, to create new sorts of power relationships" (Searle, 2005, p. 10).

Most scholars from the decentralisation literature (e.g. Larson, 2003; Ribot, 2003; Dressler *et al.*, 2006; Wardell and Lund, 2006) have explored actors' attitudes and behaviour within formal and informal micro-structures and practices of power, power networks and distribution. Their methodology could be located in new institutionalism in the sense that they examine the informal distributions of power and attitudes, rather than the formal attributes of state organisations. They have paid attention to the institutional landscape in which actors operate (Thelen and Steinmo, 1992) in a historically grounded perspective and have contextualised their analysis in the past and existing political and economic structures. Some have also considered the role of beliefs (e.g. Larson, 2003; Ribot *et al.*, 2006), which have been identified as being an important factor in policy outcomes, notably in the field of NRM (Nunan, 2006; Wong *et al.*, 2007).

Decentralisation studies thus hold many similarities with institutional analysis. Often, the main divide actually lies in the definition of the term "institution". In political ecology and power-centred writings, the meaning of "institution" has often been restricted to formal organisations[14] or pieces of legislation (Batterbury, 2006; Ribot *et al.*, 2006) whereas the term "institutional arrangements" defines the legal rules-in-use. Some scholars (Leach *et al.*, 1999; Nunan, 2006) have argued that "indirect" approaches, e.g. "empowerment, creating networks of structures for lake management, ensuring accountability, devolving rule-making powers, establishing

[14] For example, in their analysis of the decentralisation of resource management in six countries, Ribot *et al.* (2006) clearly refer to "local institutions" as "local authorities".

poverty-focused access rights, managing conflict" (Nunan, 2006, p. 1317), are preferable to changing institutions. According to the definition of institution used for this study (E. Ostrom, 2005), these "indirect" approaches are actually changing institutions, either at the collective-choice level (e.g. changing the boundary rule defining who has access to natural resources by establishing poverty-focused access rights) or at the constitutional level (e.g. devolving rule-making power). Other scholars have emphasised the importance of accountability and representation over institutions to reach efficient and equitable political outcomes (Agrawal and Ribot, 2000; Larson, 2003; Ribot *et al.*, 2006). According to the definition of institution used in this study, accountability and institutions are intrinsically linked: accountability is considered to be the direct result of institutional design and stands as an important evaluation criterion of institutional performance in the institutional framework that was used.

II.3.3. Contributions of power-centred approaches

Proponents of the power-centred approaches to the study of NRM have reacted to common-property research by advocating that the design of adequate rules at the local level is constrained by decisions made at higher governance levels. With a strongly affirmed multi-scale and historical approach, they have striven towards the enlargement of explanations of environmental change.

Political ecologists have traced the roots of environmental degradation and unequal local political, economic or social relationships in the regional, national or international political-economic structures. In addition, they have paid a particular attention to local perceptions and knowledge and often relied on empirical research. They have also stressed the non-homogenous character of communities and the local power struggles over natural resources within communities and between communities and state actors, highlighting the gap between official rules and actual practices. Decentralisation studies have revealed that the devolution of official rights to manage forest and land to the local communities is not sufficient if structural and relational mechanisms of access prevent communities to derive benefits from these rights, an argument which Ribot and Peluso (2003) conceptualised in their theory of access[15].

[15] Ribot and Peluso refer to access to technology, to capital, markets, labour and labour opportunities, knowledge, social identity and social networks.

However, these approaches hold some limitations, notably the lack of a rigorous conceptual framework. This is discussed in the next section, which argues over the advantages of reconciling institutional analysis with these approaches and presents the original framework and methodological palette, based on the IAD framework, which have been developed for this study.

III. Presentation of the framework and methodology

III.1. Selecting institutional analysis as the analytical core

Institutional analysis was particularly pertinent for this study because the recent changes in forest policies in Vietnam have greatly modified the set of actors and rules-in-use governing land use. FLA has unambiguously altered institutions by fixing new rules of land ownership, access and use. In addition to introducing explicit institutional components[16], the 5MHRP also relies for its execution on the establishment or enforcement of existing rules-in-use on land classification, land ownership and land use. Next, institutional analysis and particularly the IAD framework provide a rigorous framework that holds more analytical power than political ecology and decentralisation studies.

Institutional analysis enables to take a step forward compared to power-centred approaches: besides analysing power distribution, institutional analysis allows the design, identification and understanding of the rules-in-use that enable actors to gain, legitimise and exercise power. The possibility of improving outcomes by acting upon rules facilitates the development of policy recommendations. One of the core presumptions of institutional analysis is that we can modify actors' behaviour by changing the incentives and constraints they face. Other factors than institutions affect these incentives, e.g. the biophysical characteristics of the ecosystem in question or the political-economic context. But whereas it is extremely difficult to act upon the latter, it is possible to change the rules-in-use that shape actors' interests and power distribution. Guiding the current research along an institutional perspective aimed at overcoming one of the recognised shortcoming of political ecology, that is its limitations to formulate policy recommendations (Neumann, 2005).

[16] The 5MHRP introduces the benefit-sharing principle which for example permits the households who are contracted for forest protection to collect all forest products from thinning. The duties and benefit of households who have been given land certificates were further specified under Decision No. 178/2001/QD-TTg.

Before discussing the advantages of the IAD framework, it is important to define what a framework is and to explain what distinguishes a framework from a model and a theory. A framework identifies, structures and links the relevant variables or elements that affect the issue of concern, but does not make any predictions. On the contrary, a theory makes specific assumptions on the linkages between variables and outcomes. A model makes more-precise predictions than a theory and often relies on mathematical tools. The current research approach was based on a general framework, which permits adopting several theories or models from a wide range of disciplines. Theoretical concepts and tools were borrowed from the three research fields previously presented (LUCC studies, institutional analysis and power-centred approaches) but the core research field that guided this study was institutional analysis.

The IAD framework was selected as the core analytical framework for several reasons. Compared to other institutional frameworks, the IAD framework holds several key advantages which made it particularly well-suited to the objectives of the study:

1. its potential to link decisions of natural resources users with higher governance levels. This was an essential feature to analyse the impact of centrally designed policies on farmers' decisions over land-use change;
2. its compatibility with a wide range of disciplines, which allowed to enrich and adapt the framework;
3. its nested and synchronic character (as explained below) ; and
4. its ability to define and link key variables that affect decisions and outcomes in a collective-action situation.

The decomposability of the IAD framework allows the analyst to study a complex phenomenon by breaking it down into its several components and handling it as imbrications of systems within larger systems. Each sub-system is affected by the context of the structure of the larger system in which it finds itself. A resulting specificity of the framework is its synchronic character, described by Foucault as the following: "Whereas the old sequential analysis asked the question: a change was produced what could have caused it?; synchronic analysis asks: in order that a change could occur what other changes must there also have been in the field of simultaneous co-presence?" (1969/1984). The IAD framework indeed takes into account the co-action of the external variables and the action arena. For instance, the suitability of a set of rules-in-use to the action arena depends on the ecosystem considered and on the characteristics of the community who manages it (Ostrom, 2005). The efficiency of a specific set of rules-in-use also is affected by the biophysical conditions and attributes of the community (E. Ostrom, 2005, e.g. pp. 247-54). As a consequence – and this is another important feature of the framework – the IAD framework does not make any claim on the universal superiority of a type or set of rules-in-use (e.g. decentralisation) over another.

A further reason to select the IAD framework is its suitability to the analysis of collective action. The environmental entitlements and sustainable rural livelihoods frameworks include factors (respectively endowments or assets) that are well-suited to the analysis of the decisions of individual actors and have offered in-depth insights into household strategies. However, these frameworks do not specifically address issues raised by collective action. Collective-action problems are at the heart of this study: at the operational level, communities used to manage uplands through collective rules before FLA (**Chapter 4**). At the collective-choice and constitutional levels, the implementation and design of policies can be assimilated to the provision of a public good with clear collective-action problems (e.g. rent seeking – cf. **Chapter 6**). In collective-action problems, the analyst needs to examine how external variables influence actor's behaviour considering the actor as part of a group of actors and not as an isolated individual. For instance, the rules that do not include any control and accountability mechanisms are likely to lead to free-riding in the case of resources with a low excludability. Rules which induce severe strategic costs (e.g. power or information asymmetry among actors) might result in rent-seeking behaviour.

III.2. Ontological approach

The analysis necessitated an ontological approach suitable with the three theoretical and methodological perspectives adopted, i.e. land-use change research, institutional analysis, and power-centred approaches. In this respect, Critical Realism provided an attractive option. Critical Realism is a new form of scientific realism, emerging from the works of two philosophers of science Roy Bhaskar (1975) and Rom Harré (1972). In philosophy, realism signifies "the assertion of the existence of a reality independently of our thoughts or beliefs about it" (Marshall, 1998, p. 552). Critical Realism does not reject the existence of a "real" world but acknowledges that our understanding of the structures of the society and of the biophysical world is partial and depends on social and political framings which influence research approaches. Critical Realism maintains that all environmental problems are perceived differently depending on a wide range of factors such as cultural beliefs, the claim of belonging to a social group or political reasons. It recognises that social groups have an influence on scientific enquiry[17] (Batterbury *et al.*, 1997; Forsyth, 2003).

As with post-modernism, Critical Realism rejects positivism and recognises that there are sociological determinants in the production of science and knowledge. However, critical realists do not qualify themselves as post-modern (e.g. Groff, 2004). In particular, they have criticised the relativism of strong post-modernists, who claim that all truths and claims are equally valid, depending upon one's perspective. As a response to relativism, Critical Realism respects the concept of truth and rejects the assumption that all knowledge claims are equally valuable and founded. Critical Realism provided a coherent and solid ontological basis for this study since it encourages relying on both realist and constructivist approaches, using biophysical data to assess environmental change while at the same time critically evaluating how the latter is socially constructed through discursive analysis.

III.3. Politicising the IAD

As stated previously, a major asset of the IAD framework is its ability to link the operational level, where actors take decisions regarding NRM, with higher institutional levels. However most NRM-related research works using the IAD framework have hitherto focused on the operational level. Extensive research has been conducted on how local rules-in-use affect NRM. But few attempts have been made to link local rules-in-use with decisions taken at higher levels, particularly with policies designed by regional authorities or central governments or with the international political and economic context (notably Lam, 1998; Sproule-Jones, 1999; Agrawal and Ostrom, 2001; Ghate, 2003). The proposed methodological development of the IAD framework specifically aims to facilitate the analysis of environmental policy processes. Accordingly, two exogenous variables were added to the original IAD framework (Figure 2-4; added variables appear in grey shaded boxes).

---

[17] For example, foresters are suspected to have deliberately supported some over-simplified or biased narratives on forest environmental benefits such as "forests increase run-off" or "forests can mitigate large-scale floods" (cf. Calder, 1998).

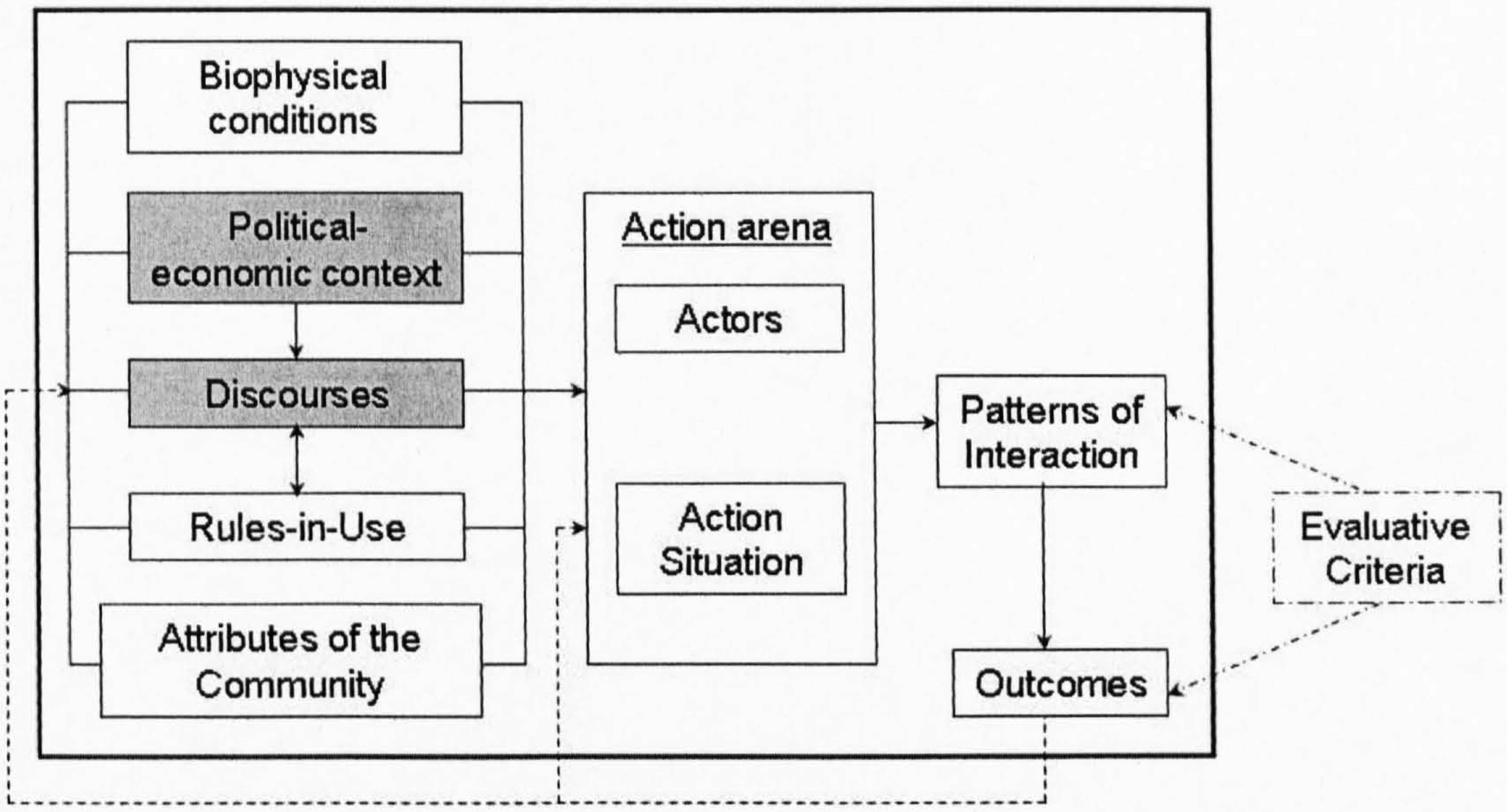


Figure 2-4. The revised IAD framework adopted for this study

External variables were extended to include contextual factors (cf. Edwards and Steins, 1999), and in particular the political-economic context, located at the local, regional and national level. The analysis also stressed the role of discourses in the way they shape values, norms and preferences, and position actors (Hajer, 1995). In the framework adopted, discourses are considered to affect the rules-in-use and to be influenced by the institutional and political-economic context in which they have emerged (Figure 2-4).

In addition, the influence of beliefs (see Definition Section and Section III.3.3 in this chapter) in the internal valuation mechanism that actors use to make decisions was acknowledged. It was added as an internal variable in the holon "actor" (Section II.2.2 in this chapter). To make the role of beliefs more explicit, a variable "perception of the biophysical conditions" was added between the "biophysical conditions" and the action arena (see Figure 2-5 in Section III.4 in this chapter). This revision acknowledges that environmental problems are socially constructed and depend on cultural setting and on the social group of actors who observe it.

III.3.1. Political context and power issues

A recent criticism of the IAD framework was directed against its limitations to adequately consider the role of power and interests in the crafting of institutions (Ribot, 2006). The original IAD framework does not explicitly bring power issues to the fore because power relationships are framed by and, to some extent, encapsulated within institutions. As argued previously, institutions and power are intrinsically linked. But before analysing a set of institutions, it is necessary to understand how power is distributed and how political and financial interests drive actors' decisions within a particular set of rules-in-use. Considering the political-economic context is thus essential to understand why central political actors are willing to give up power to other actors (Agrawal and Ostrom, 2001; Ribot *et al.*, 2006). Decentralisation studies have indicated that the motives of central actors to devolve power are indeed key determinants of the effectiveness of these policies regarding pro-poor outcomes and sustainable NRM (Agrawal and Ostrom, 2001; Ribot *et al.*, 2006). In a next step, institutional analysis can inform the analyst on how the current set of rules-in-use affects power distribution and whether and how institutional change can lead to more-equitable outcomes.

III.3.2. Discourses

Hajer argues that whether or not environmental problems call for institutional change depends largely on the way they are framed and defined in discourses (1995). The definition of discourse adopted in the analysis is *"A specific ensemble of ideas, concepts, and categorizations that is produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities"* (Hajer, 1995, p. 60).

Discourse analysis is particularly pertinent in the representation of power proposed by Foucault: power is not held by a centralised or identifiable unit but is distributed among the society and expressed by the multiple micro-practices of a myriad of actors (Foucault, 1975, 1976). In this perspective, discourses are both an expression and instrument of power and knowledge which continuously transform the society: *"C'est dans le discours que pouvoir et savoir viennent s'articuler*[18]*"* (Foucault, 1976, p. 133).

The categorisations of the world that discourses convey apply a specific structure of knowledge and power on society (Foucault, 1980). They prescribe what is right and wrong, normal and abnormal, legal and criminal. They imply the inclusion and exclusion, legitimacy and illegitimacy of social categories of actors. For instance, global discourses on NRM have created a lowland-upland polarity, blaming upland

[18] Literally translated: "It is in discourse that power and knowledge articulate."

people for lowland problems, e.g. regarding the links between deforestation and flooding, erosion and river sedimentation. These discourses have considerably reduced the legitimacy of upland people to manage forest and land and have resulted in policy decisions making illegal certain land-use practices of upland communities (e.g. shifting cultivation in Vietnam). The consideration of discourses allows a critical analysis on the terms of the debates related to forest and land policies.

Discourse analysis is not contradictory with institutional analysis. Indeed it is in accordance with sociological institutionalism arguments that discourses confer power to institutions by reinforcing or undermining their credibility. In return, institutions influence discourses as the latter depend on the institutional practices in which they are embedded (Hajer, 1995).

III.3.3. Beliefs

A common theme for the failures of forest policies is the misconceived beliefs that policy-makers have about the capacity of local users to manage natural resources sustainably and on aspects of the natural resources themselves (e.g. their oversimplification of environmental systems) (Nunan, 2006; Wong *et al.*, 2007). Beliefs can indeed affect policy change (Sewell, 1985; Sabatier and Jenkins-Smith, 1999; Sabatier and Weible, 2006) and have been recognised to be an important determinant of institutional performance (North, 1990; Denzau and North, 1994). Sabatier and Jenkins-Smith defined three types of beliefs (1999, p. 121-122): (1) the deep core beliefs, which are "basic ontological and normative beliefs"; (2) the policy core beliefs, which are "basic normative commitments and causal perceptions across an entire policy domain or subsystem"; and (3) the beliefs concerning day-to-day decisions, called in the dissertation "operational beliefs". In the present analysis, the beliefs considered belong to types (2) and (3).

It is particularly relevant to consider beliefs under the Vietnamese context as an ideological struggle still opposes the conservatives, who believe in the socialist model, and the reformists, who envision an economic development based on capitalism. The most significant economic and political shift, the Doi Moi (*Đổi Mới,* literally new change), was the result of bottom forces (Kerkvliet, 1995) but, ultimately, it reflected a move in the policy core beliefs of Vietnamese policy-makers (McCarty, 2002).

Operational beliefs are also an important component of actors' behaviour at the operational level because of the particular characteristics of the forestry sector (Schluter, 2007). Compared to other land uses, it is suspected that the high level of uncertainty of forestry activities related to the biophysical complexity of forest and its long production cycle makes farmers rely more on beliefs than on rational economic reasoning.

However, contrary to the advocacy coalition framework proposed by Sabatier *et al.* (Sabatier and Jenkins-Smith, 1999; Sabatier and Weible, 2006), the framework adopted does not consider beliefs as an external variable but internalise them within the "actors" holon. The variable "perception of the biophysical conditions" was added to explicitly acknowledge the social construction of environmental processes. However, the way beliefs impact on outcomes was considered to be part of the internal valuation mechanism of the actors. As further discussed in **Chapter 7** which analyses policy design at the central level, discourses rather than beliefs are drivers for policy change in the framework adopted.

III.4. Presenting the framework

The overall framework adopted for this study is presented in Figure 2-5.

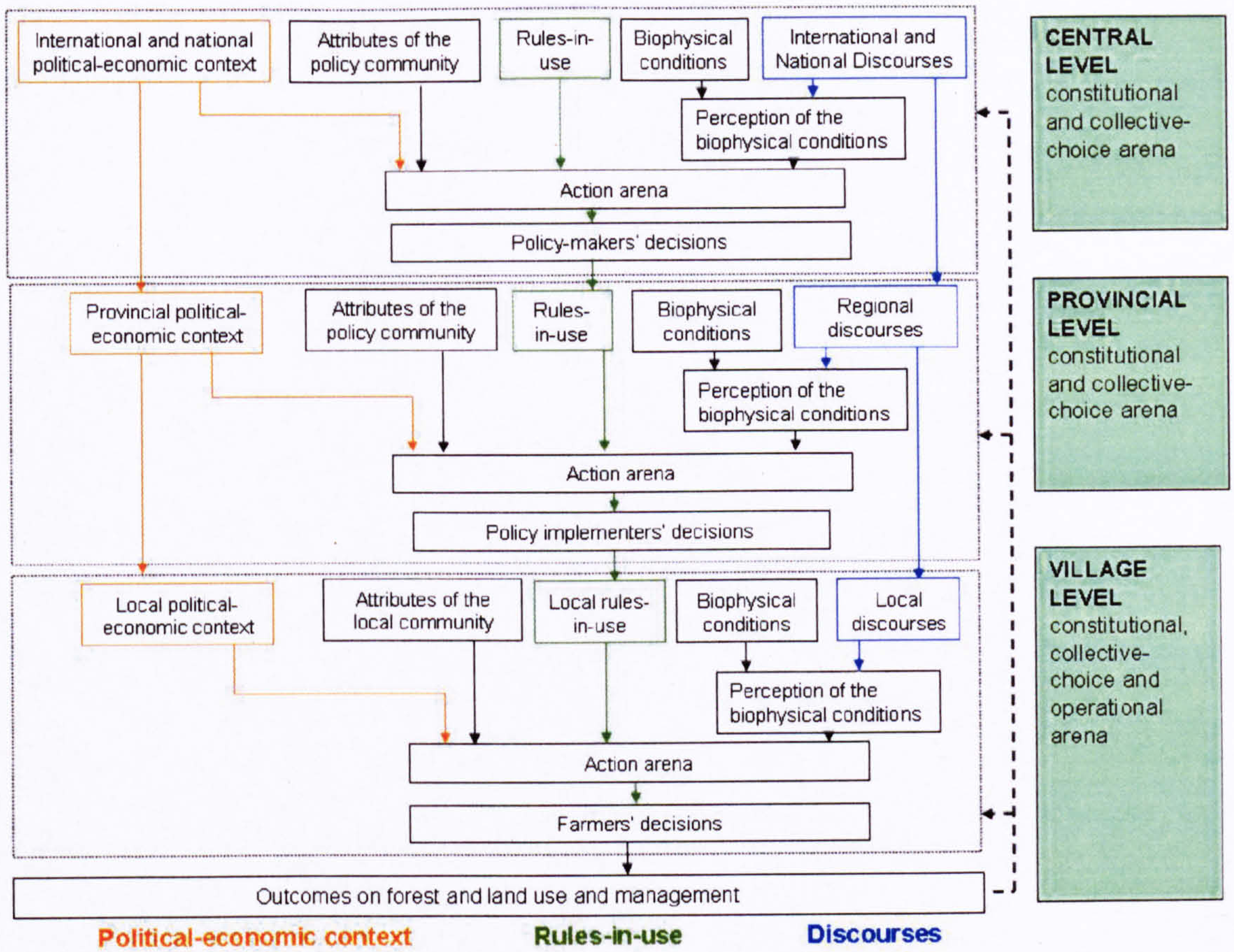


Figure 2-5. Overview of the overall framework adopted for this study

The framework is characterised by two categories of interwoven levels:

1. The institutional levels of the IAD framework, i.e. the operational, collective-choice level and constitutional levels (Ostrom *et al.*, 1994).

2. Decision-making levels over forest and land management in Vietnam: village, province and central levels. The administrative units in Vietnam are, from the lower to the higher level: commune, district and province. The village is not officially recognised as an administrative level[19] but is an important unit of community organisation and collective action for upland management. Some interviews were led with the commune and district authorities but these levels were not investigated thoroughly because of time and capacity constraints.

Some might argue that combining multiple theoretical perspectives in a single conceptual framework will result in an internally contradictory and messy approach, with a limited explanatory capacity. The next section discusses the marked advantages of adopting these distinct but non-mutually exclusive theoretical components.

[19] Yet, two legal decisions recently recognised the village as a self-governed organisation with the right to organise collective action (Decision 13/2002/QD-BNV and Decree 79/2003/ND-CP).

III.4.1. Reconciling several theoretical perspectives and methodologies

The framework designed and adopted for this study permits combining various methodologies: ethnography, institutional analysis, political-economic analysis, spatial regression analysis, policy-process analysis and discourse analysis.

The framework borrows from decentralisation studies and the materialist and structuralist branch of political ecology a multi-level concern with linking farmers' decisions over land use (Objectives 4 and 5; **Chapter 5 and 6**) and the decisions of the provincial authorities and central policy-makers (Objective 6; **Chapter 6 and 7**) with the micro- and macro-level political-economic structure.

The examination of various discourses on forest, land degradation and land management was inspired by the constructivist branch. Accounts on forest and land, including figures of forest cover, have been considered with caution throughout all research stages by linking them with their source and context. Moreover, the analysis thoroughly explored how dominant representations of forest and explanations of deforestation have affected the decisions of farmers over land use (Objective 3; **Chapter 4**) and have shaped policy implementation (Objective 5; **Chapter 6**). It examined how these narratives on forest and land management have emerged, to which extent they are based on solid evidence, and how they have affected policy design (Objective 6; **Chapter 7**).

The co-production of scientific knowledge and politics at the policy-design stage was also particularly considered. It entailed examining how the political agenda has been framing research conducted by national research institutes in Vietnam and how scientific knowledge has contributed to policy change (Objective 8; **Chapter 7**). By following this post-structuralist strand of political ecology, the aim of this study was to "assess the political construction of what is considered to be ecological" (Forsyth, 2001, p. 147).

However, the present approach is realist because it has relied on empirical findings, derived from the use of remotely sensed imagery and Geographical Information System (GIS), to estimate the actual change in forest cover. The modelling of forest-cover change at the provincial scale using spatial regression analysis facilitated the identification of major spatial trends at the meso- and macro-level. This quantitative component was also essential to make appropriate policy recommendations and to disseminate them effectively.

Lastly, the approach adopted is historically sensitive, not only in the analysis of the evolution of discourses on forest and land over time, but also in its assessment of environmental change. Drawing from an archaeological line of scientific enquiry, this approach goes back in history to assess environmental change and to consider the evolution and discontinuities of discourses related to forest, land degradation and land management along with the political directions that have been taken. It allowed a critical examination of deforestation and afforestation processes, recognising their possible non-linear character and locating them in their political-economic context.

III.4.2. Structure and agency

Despite its methodological eclecticism, the framework has a coherent approach to the problem of structure and agency. Actors are given a central role in the explanation and analysis of outcomes but their decisions are influenced by the structural and discursive systems in which they evolve. For instance, the influence of discourse is examined (**Chapters 4, 6 and 7**) while recognising "actors' consciousness, intentionality and responsibilities" (Keeley and Scoones, 2003 , p. 38). Structure and agency are considered to be interdependent but are theoretically examined separately, which is a distinctive feature of Critical Realism (Greener, 2005). This divisions is thought to bring greater explanatory power. Furthermore, the IAD framework is in line with political ecologists' views on environmental agency. Nature is not conceived as the passive recipient of human action but rather as an actor *per se*, who influences human decision and behaviour. This role is explicit in the framework through the presence of the external variable "biophysical conditions".

III.4.3. Methodology of inference

The form of scientific inference that guided the analysis, retroduction, involves the explanation of events by identifying the structures and mechanisms that are capable of producing them (Sayer, 1992, p. 107). After locating the actors into the political-economic context (**Chapter 3**), case studies were selected at the scale of three villages and relationships between variables at the household level explored by applying the IAD framework to empirical observations (**Chapter 4**). The objective was to understand how farmers make decisions on land use under a range of political contexts, biophysical conditions and community attributes.

Secondly, this confrontation of empirical evidence with causal mechanisms was iterated at a wider spatial resolution and unit of observation: the commune level at the provincial scale. At this stage, the aim was to assess land-use change and to identify at the meso-level what are the drivers and proximate causes for change in forest cover (**Chapter 5**).

Thirdly, a new iteration was performed at the provincial level relying on qualitative data and expanding the area of observation to four provinces (**Chapter 6**). The focus at this stage was the investigation of which factors have influenced the implementation of policies in several provinces and how particular decisions taken by provincial authorities have affected farmers' decisions regarding land use. Then, the framework was enlarged by moving up the analytical loop to the central level in the policy-design arena (**Chapter** 7). This last analytical round allowed to explore the range of factors (e.g. scientific knowledge) that have affected the interests and beliefs of central policy-makers during policy design, and to link these with the policy outcomes observed at the provincial and local level.

As a final step, the lessons learnt were synthesised to aid the design of relevant and appropriate policy recommendations and to disseminate them effectively (**Chapter 8**). They were drawn using multiple sources of evidence: qualitative data derived from ethnographic work, observation, interviews, historical and archival research, and; quantitative data, such as socio-economic statistics, forest-cover areas calculated from remotely sensed images and biophysical data.

III.5. Unpacking the framework

Three action arenas were examined in this study: the decision-making process of farmers over land use (**Chapter 4**), of provincial authorities over policy implementation (**Chapter 6**) and of central policy-makers over policy design (**Chapter 7**).

In every action arena, the holons of the framework can be unpacked according to the perspective considered to be the most relevant and illuminating. For instance at the local level, a special attention was given to the local rules-in-use governing land management in the uplands (**Chapter 4**). In **Chapters 6 and 7** where the factors affecting policy implementation and design were explored, a greater focus was directed at the set of actors involved in the policy-making arena and the range of incentives they faced. There was a particular emphasis in the study of policy design on the way policy-makers have acquired, processed and used knowledge and information (**Chapter 7**). Hence, the framework has been used as a way of structuring analysis and providing a menu of questions, alternatively or simultaneously taken from the theoretical approaches adopted. The characteristics of the holons which are specific to the arena considered are presented with further detail in the relevant chapters (**Chapters 4, 6, and 7**). This section reviews some of the key assumptions on the holon "actors" which were considered to be valid for the whole study.

Located in the action arena, actors are the central variable in the analysis. It is thus essential to select a relevant model for actors' behaviour, as this determines whether actors respond weakly or strongly to various sets of external variables. Theories of individual choice compatible with the IAD framework primarily stem from neoclassical economics and rational choice theory (E. Ostrom, 1999): according to the information they receive on external conditions, individuals make calculations to select choices that will maximise their self-interest. The neoclassical economic model of rational behaviour has been commonly used by a wide strand of the new institutional economic analysis (Dequech, 2006). However, there are several limits inherent to the maximisation behaviour (a review of these criticisms is proposed in van den Bergh *et al.*, 2000). Although it is satisfactory in stable and competitive environments where individuals hold full information, there are many situations where individuals do not act as *Homo Economicus* (Frolich *et al.*, 1994; E. Ostrom; 2005). North argued that neoclassical economic theory fails to account for "behaviour in which calculated self-interest is not the motivating factor" (North, 1981, p. 11) and proposed a theory of institutions which combines a theory of human behaviour with a theory of the costs of transacting (North, 1990). Reconciling cultural and rational-choices approaches is not incompatible and has its own advantages (Kohli *et al.*, 1995; Scharpf, 1997). E. Ostrom also recognises that, whereas in some situations actors follow their self-interest, their behaviour is heavily influenced by norms and values under other contexts (E. Ostrom, 2005). She proposes to integrates norms in the analysis of collective action by adding a positive or negative delta parameter to the payoffs related to a particular action (E. Ostrom, 2005).

A similar approach was adopted for this study. Vietnamese cultural characteristics (e.g. as underlined by Tran Duc Vien and Rambo, 2001) led me to consider norms as an important component of the valuation process. In Vietnam, norms are particularly strong as the whole society is thought of as a family. As expressed in Vietnamese language, Vietnamese people do not perceive themselves as single, isolated individuals in a wider society but refer to their own position vis-à-vis their family, their friends, their work colleagues, the community in which they live and the whole society with which they interact. Individual's needs and aspirations are framed by individual's role in society and society's overarching rules. In this context, it was particularly important to consider norms and perceptions shared by actors. The model of actors' behaviour selected for this study is based on a rational model but considers that the payoffs actors calculate for each option are heavily influenced by norms. For instance, the payoff attributed to a choice considered normatively correct gets an added positive value.

III.6. Reflexivity

The research fieldwork in social sciences has to be understood not as an objective observation of a researcher on research subjects but as an interaction between several social actors who simultaneously shape the scientific enquiry. Every researcher is thus part of the research field, with her/his own interpretation of the data collected. Personal experience and cultural and educational background influence not only the way of conducting research and its direction, but also the interpretation of interviews and texts, particularly when the researcher is not a native of the study area, as in the present case.

Generally, we tend to collect and rely on evidence that supports our own arguments and to ignore other sources. In addition, like all research, my study was influenced by social groups and research networks which have shaped my perceptions of problems. There is no complete solution to eliminate fully these biases. The essential steps are to (a) be aware of them, (b) try to reduce them, (c) evaluate them and consider them during analysis. The use of hybrid knowledge is an effective way to reduce this bias (Batterbury *et al.*, 1997). As argued by Latour (1993), every kind of knowledge is a hybrid mixture of facts and norms, a composite of nature, discourses and society. It implies on the one hand that scientific knowledge is not the only valuable basis for analysis. On the other hand, indigenous knowledge should not be "romanticised", i.e. considered as always superior to other forms of evidence (Forsyth, 1996). The reliance on hybrid knowledge helps one to reconcile several perceptions without opposing them. It has been successful in providing accurate and faithful explanations of environmental change (Forsyth, 1996; Thomas and Twyman, 2004). In addition to the use of scientific data based on empirical biophysical measurements, this study relied on evidence and claims from a high diversity of sources. Data were collected through interaction with a wide range of actors: farmers, state cadres at the commune, district, provincial and central levels, development practitioners working on the field or devoted to advocacy work, researchers working in natural and social sciences, Vietnamese and foreigners, men and women, occupying junior and senior positions. Written documents (e.g. research reports, project evaluation, legal documents) were gathered from state bodies at several administrative levels, Non-Governmental Organisations (NGOs), research organisations and donors. Lastly, critical evaluation and feedback were received all along the research process thanks to presentations of the progress of the study to various audiences (see list in **Annex A**).

IV. Ethical issues

At all stages of the research, the six key principles of ethical research defined by the UK Economic and Social Research Council (Economic & Social Research Council (ESRC), 2006) were adhered to:

1. The research was designed, reviewed and undertaken to ensure integrity and quality;
2. All persons collaborated or interacted with during the study, and more particularly research subjects, were fully informed about the purpose, method and possible uses of the research: collaborating research teams from the IRD and SFRI were kept informed as to research design, objectives, methodologies used and on the details of the fieldwork (planning, list of interviewed people, themes to be discussed) before each stage of fieldwork. Prior to interviews the purpose of the work, its aim and the rationale and design of the interview were systematically explained to interviewees and, when relevant, to the responsible of the department/organisation. Finally, feedback on the fieldwork carried out in the villages was delivered to village inhabitants. All Hanoi-based key informants were invited to presentation of project results;

3. Confidentiality and anonymity were ensured. Namely, all quotations taken from interviews are maintained anonymous in publications and presentations or if not figure with the agreement of the author;
4. Participation of research subjects was voluntary and free from coercion: all interviewed people were informed in advance and asked for their agreement. They were given prior to the interview, the date, time and schedule of the interview/focus group. They were free to cancel, move, or stop the interview during the process;
5. Any harm to persons collaborated with and more particularly research subjects has been avoided: efforts were made to keep the disturbance resulting from my fieldwork in the villages as minimal as possible, e.g. by avoiding favouring any household more than another in any manner; and
6. Independence of the research has been made clear and any conflict of interest or partiality made explicit.

V. From research to policies

The final objective of this study was to design and disseminate relevant policy recommendations. Bridging the gap between research and policy has often been a difficult exercise but it is all the more true for a young female foreigner researcher in Vietnam (all these attributes making it more difficult to approach and be heard by policy-makers). The strategy adopted to disseminate research results effectively draws on the methodology of the British Overseas Development Institute (ODI) Research and Policy in Development (RAPID) Programme (Figure 2-6).

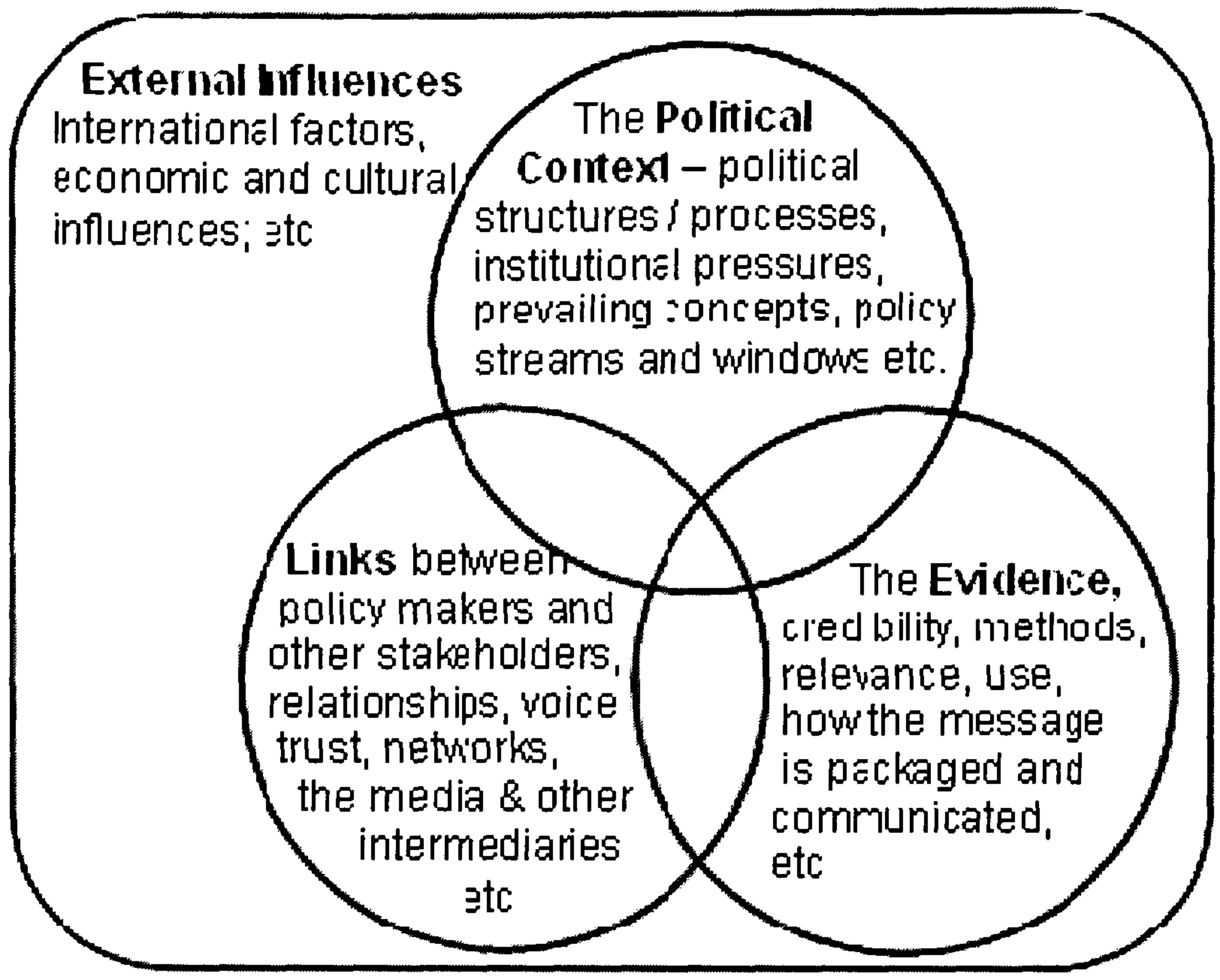


Figure 2-6. RAPID framework (Crewe and Young, 2002)

In their study of the impact of research and evidence on policy, Crewe and Young (2002) identified three major elements: context, evidence and links.

1) Context encompasses both the macro political-economic structure, the underlying beliefs that frame policy-makers' decisions and the bureaucratic pressures exerted on civil servants that might lead them to resist policy change;

2) Evidence is defined as the information and knowledge built from activities ranging from theoretical or applied research, desk-based research, research in the labs or on the field, development projects, experiments led by local authorities and policy implementation. Critical factors include its quality, its credibility and whether it contradicts or supports existing prevailing discourses and narratives; and

3) Links between informants and policy-makers are considered to be essential. Of particular importance are the credibility and legitimacy of the informants: policy-makers will tend to pay more attention to the evidence provided by those considered as experts than by other sources.

The preliminary analysis of the political-economic context, the political and administrative structure and prevailing discourses in the policy-making arena supported the dissemination of the research results. Integrating a quantitative component into the analysis was also a deliberate choice to strengthen the credibility of results vis-à-vis donors and policy-makers. Support to design policy briefs was provided by the Centre of Land Use and Water Resources Research (CLUWRR) of Newcastle University. CLUWRR's experience in conducting interactive research with government departments in several developed and developing countries was extremely helpful in this regard. Lastly, attempts were made to build strong relationships with networks of people who might have an impact on policy-making especially Vietnamese research institutes throughout the fieldwork conducted in Vietnam. This effort, greatly facilitated by the IRD and SFRI support in Hanoi, included an active part in local conferences and workshops, and in particular, interaction with researchers from the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD), the think tank of the Ministry of Agriculture and Rural Development (MARD).

Chapter 3. Setting the scene: action arena for forest policies in Northern Vietnam

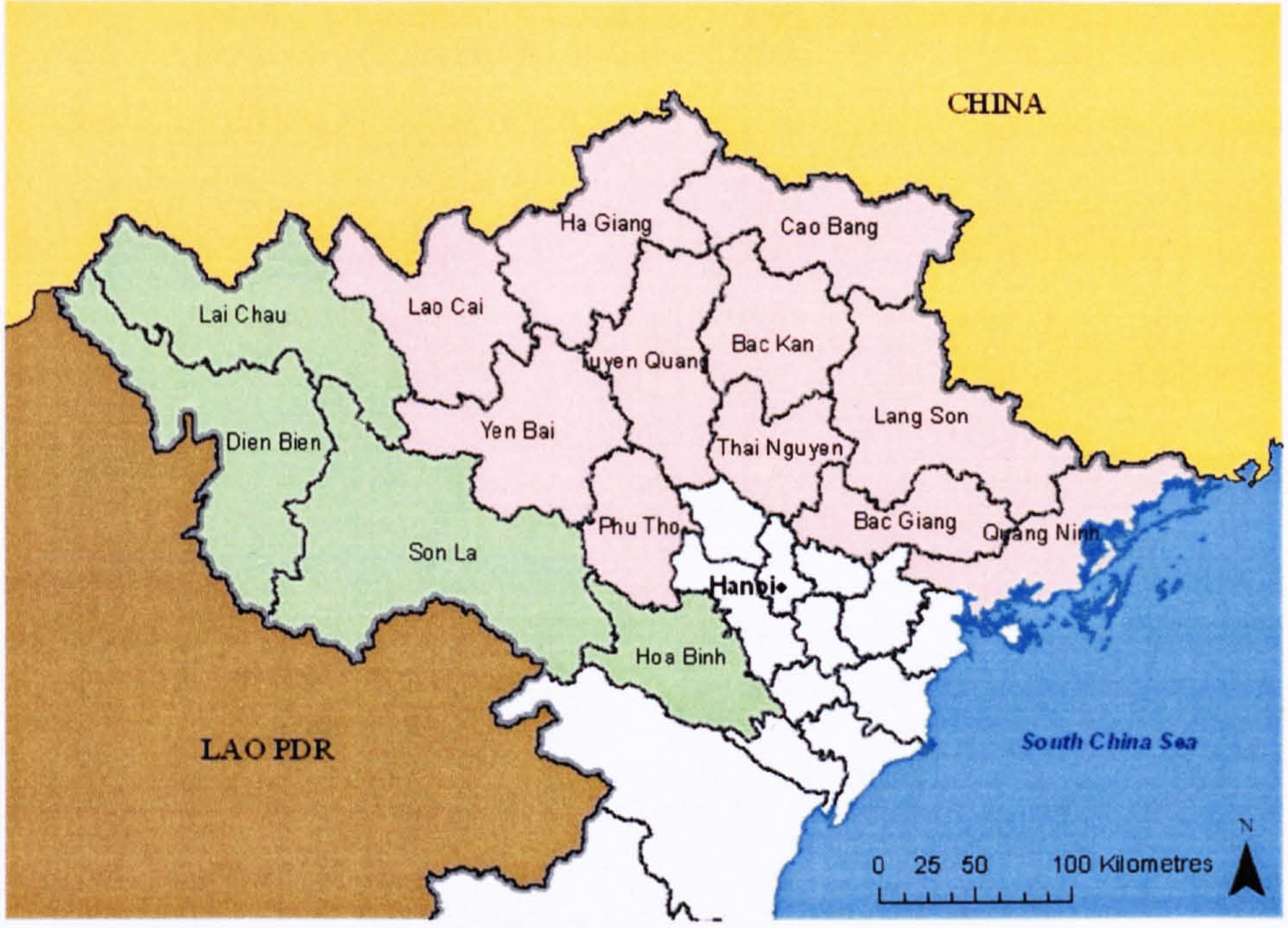
This chapter provides a general overview of the action arena of the study: the set of actors who participate in land and forest management and in the design and implementation of land and forest policies, and the action situations, which outline the relationships between actors and uplands. It also describes the characteristics of external variables affecting the action arena: the biophysical attributes of northern uplands and forest, the cultural attributes of upland communities and the institutional context and governance system which aim to regulate people-upland-forest relationships.

The chapter is structured as follows: it first gives general traits of the socio-ecological system composed by people-uplands in Northern Vietnam. Then, it introduces the governance system that issues and implements the rules-in-use relative to this socio-ecological system. Next, it gives an overview of the historical evolution of the political-economic context and of the relationship between local people and uplands for the past three decades. The last section presents the two policies particularly examined in this study: FLA and the afforestation campaigns.

I. People-land-forest relationships

I.1. General characteristics on land and population

The NMR of Vietnam (map 3-1) borders China, Lao PDR and the South China Sea. Its provinces are usually grouped under two ecological-climatic zones, crossed from the north-west to the south-east by the Red River (*Sông Hồng*) and the Black or Da River (*Sông Đa*). The north-west sub-region includes the provinces of Hoa Binh, Son La (*Sơn La)*, Lai Chau (*Lai Châu)* and Dien Bien (*Điện Biên)*, and the north-east 11 more provinces (Map 3-1). The NMR spreads over an area of 101,000 kilometres square (km^2) (30 per cent of Vietnam's total land area), and has approximately 12 million inhabitants, i.e. 14 per cent of the population (GSO, 2006).



Map 3-1. Administrative map of the NMR of Vietnam
North-west provinces appear in green and north-east provinces in pink.

The region's humid subtropical climate is characterised by four distinct seasons and a high humidity. Summers (April to August) are wet and hot, while winters (December to February) are cool, cloudy and moist. Whereas the average annual temperature is 25°C, temperatures can go up to 35°C in summer down to 10°C in the lowlands and as low as 0°C in high altitudes during winter. Average annual rainfall ranges from 1100 to 3000 millimetres (mm) (Nguyen Thi Chuc *et al.*, 2006). Heavy monsoon rainfalls occur during summer – approximately 80 per cent of the precipitation occurs between July and September, whereas precipitation is rare in winter, except under the form of a drizzle that can last several hours in January - February.

The region is striking for its biophysical, ecological and landscape diversity. It includes large basin areas, such as the Dien Bien Phu *(Điên Biên Phủ)* Basin, narrow river valleys, granitic peaks as in Yen Bai *(Yên Bái)* Province and limestone mountain ranges across the provinces of Lao Cai *(Lào Cai))* and Lai Chau. Schist is the predominant rock, other major rock types being limestone, granite and marble. Vietnamese mountainous areas are commonly distinguished into three altitudinal and cultural zones (Tran Duc Vien, 2003): the high mountain zone (or highlands) above 800 metres (m) (Picture 3-1); the low mountain zone (or lowlands), around 200-300 m altitude, including valleys with flat land (Picture 3-2); and the mid-elevation mountain zone (or midlands), by default defined as the area between the low and high mountain zones (Picture 3-3). The largest high mountain zone is located in the provinces of Lao Cai and Lai Chau and includes the Hoang Lien Son *(Hoàng Liên Sơn)* range which culminates at 3,143 m at the Phan Xi Pang *(Phán Xi Păng)* Peak. The midlands comprise approximately one third of the land area of the region, occupying some parts of the provinces of Tuyen Quang *(Tuyên Quang),* Yen Bai, Hoa Binh and Quang Ninh *(Quảng Ninh)*. The relief is composed of rolling hills surrounding valleys with alluvial soils used for irrigated rice cultivation. Large tracts of lowlands extend over the provinces of Phu Tho *(Phú Thọ)*, Thai Nguyen *(Thái Nguyên)* and Bac Giang *(Bắc Giang)*. Around 10 per cent of the world's mammal, bird, and fish species are found in Vietnam (Zingerli, 2005), with more than 13,000 plant, 5000 insect, 800 bird, 275 mammal, 250 reptile, and 80 amphibian species in forest ecological habitats

Picture 3-1. A view of highlands in North Vietnam
Source: Christelle Clement, November 2005

Picture 3-2. A view of a lowland area in North Vietnam
Source: Christelle Clement, November 2005

Picture 3-3. A view of midlands in North Vietnam
Source: Christelle Clement, November 2005

Adding to the ecosystem diversity of the region is the social and cultural richness of communities. The population includes 31 of the 54 officially recognised ethnic groups in Vietnam (Michaud *et al.*, 2002), with a high ethnic heterogeneity across the region. Michaud *et al.* (2002) reported that more than half of the districts of the northern provinces count at least 10 ethnic groups on their territory. Because of the high ethnic mixing that occurred during South-East Asian history, these groups are usually characterised and distinguished by their linguistic belonging, according to four families (Table 3-1).

Table 3-1. Main ethnic groups living in the NMR by linguistic families

Linguistic branch	Main ethnic groups
Mon *(Môn)* / Khmer *(Khơ-me)* or Austroasiatic	*Kinh (Kinh)*, Muong (*Mường)*
Mong Dao *(Mông Dao)* / H'Mong-Mien (*H'mông-Miền*)	H'Mong, Dao and Pa Then (*Pà Thẻn)*
Sino-Tibetan	Chinese, Ha Nhi (*Hà Nhì)*, La Hu (*La Hủ)*, Lo Lo (*Lô Lô)*, Phu la (*Phù Lá)*, San Diu (*Sán Dìu)* and Si La (*Si La)*
Thai *(Thái)*/Tay *(Tày)-Kadai*	Thai, Tay, *Co Lao (Cờ Lao)*, La Chi (*La Chí)*, La Ha (*La Ha)*, San Chai (*Sán Chay)* and Pu Peo (*Pu Péo)*

Sources: Dang Nghiem et al., 1993; Michaud et al., 2002

The most numerous groups in the region are the Kinh (51.1 per cent of the NMR population and 86.2 per cent of the total population in 1999 (GSO, 2001)), the ethnic majority group, the Tay, Thai, Muong, Nung (*Nùng)*, H'Mong, Dao, San Chai and San Diu (WHO, 2003). Many of these groups have been associated with a particular agroecological setting. The Kinh have for centuries inhabited the delta regions of the country, staying away from forests and developing irrigated rice cultivation. They started migrating en mass to the NMR in the 1960s, through government-led migration programmes. While the H'Mong have usually itinerated in the highland region, the Muong, Tay and Thai have settled in the lowland areas of the NMR. Government sedentarisation policies initiated in the late 1960s have greatly altered these geographical patterns. As a result, most of the upland population have presently adopted sedentary lives.

Population density greatly varies (Table 3-2) from an average of 35 persons/km^2 in the province of Lai Chau to 413 persons/ km^2 in the province of Bac Giang (GSO, 2006), with greater disparities within each province. It is relatively low compared to the neighbouring Red River Delta where the average reaches 1213 persons/km^2. In 2005, only 18 per cent of the population lived in urban areas (GSO, 2006).

Table 3-2. Figures of population in the NMR by province in 2005

	Population (1000 p)	Population density (p/km^2)	Agricultural population density* (p/ km^2)	Percentage of urban population (%)
Whole country	83106.3	251	883	26.9
NMR	11917.8	117	806	18.1
North-east	9354.7	146	956	19.3
Ha Giang (*Hà Giang*)	673.1	85	455	11.0
Cao Bang (*Cao Bằng*)	514.2	76	616	13.6
Bac Kan (*Bắc Kạn*)	298.6	61	792	15.4
Tuyen Quang	726.2	124	1037	9.4
Lao Cai	575.0	90	747	20.1
Yen Bai	731.8	106	921	19.7
Thai Nguyen	1110.0	313	1185	23.4
Lang Son (*Lạng Sơn*)	739.1	89	659	20.1
Quang Ninh	1079.2	177	1977	48.6
Bac Giang	1580.7	413	1273	9.2
Phu Tho	1326.8	376	1347	15.7
North-west	2563.1	68	513	13.9
Dien Bien	449.9	47	38	16.8
Lai Chau	314.7	35	407	15.6
Son La	988.4	70	399	10.9
Hoa Binh	810.1	173	1454	15.4

* *Agricultural population density is the number of persons per km^2 of agricultural land*
Source: General Statistics Office (GSO), 2006

The average per capita agricultural land area is 12.4 km^2 in the uplands, almost three times higher than in the Red River Delta region (GSO, 2006). However, contrary to a common assumption held by central policy-makers that the NMR encompasses large tracts of unused land, natural resources and especially agricultural land are often scarce for upland communities because of the low carrying capacity of the land (Le Trong Cuc and Rambo, 2001). Agricultural land in the NMR is less fertile than in the delta, resulting in lower agricultural yields (e.g. in 2005, paddy yields were 5.4 t/ha in the Red River Delta and 3.6 t/ha in the north-west sub-region (GSO, 2006)).

I.2. Land use

According to the 1993 Land Law, land is classified into six categories (National Assembly of Vietnam, 1993, Article 11): (1) Agricultural land; (2) Forestry land[20]; (3) Rural residential land; (4) Urban land; (5) Land for specialised use[21]; and (6) Unused (literally "not yet used": in Vietnamese *chưa dừng*) land. These categories are defined according to the main purpose of utilisation and do not reflect the actual land use. Land classified as forestry land does not necessarily have a forest cover. The term "forestry land" used in this dissertation refers to the land category defined in the Land Law, i.e. land classified for forestry purpose (with and without forest cover). Land with a forest cover is labelled "forested land".

Figure 3-1 gives an overview of the proportion of land use categories in the NMR in 2000.

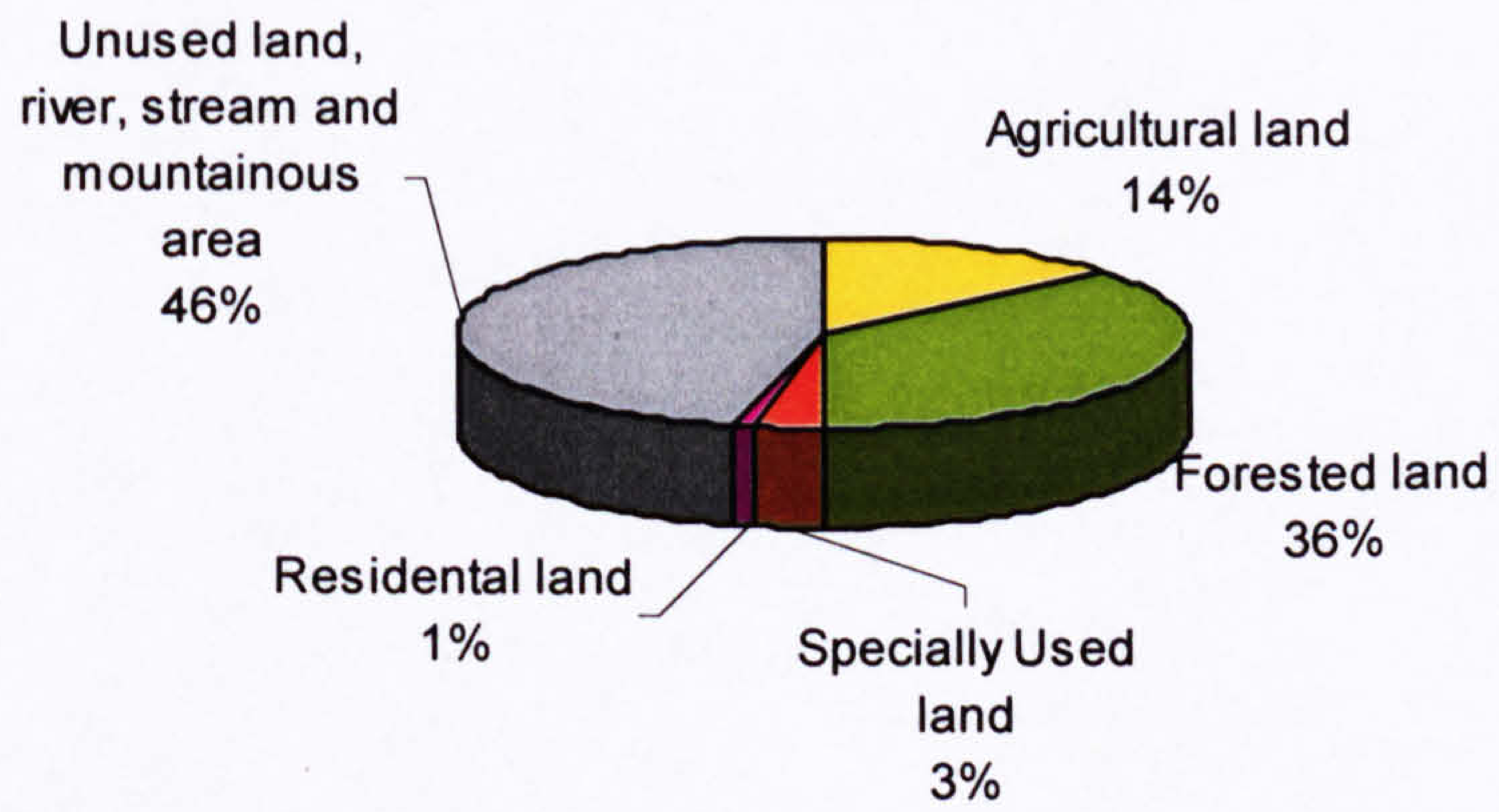


Figure 3-1. Land use in the NMR in 2000 according to the GDLA land use classes
It differs from the current classification used by the MARD: the category "forestry land" used by the MARD is divided into "forested land" and "unused land and mountainous area".
Source: GDLA (now MONRE), 2000 in MARD *et al.*, 2003d

Approximately three quarters of the NMR area is classified as forestry land (Table 3-3). Forest cover is relatively higher than the national average with 45.7 per cent of

[20] The term "forest land" has been generally used to designate this category in English. I prefer however using "forestry land" which literally corresponds to the Vietnamese term "*đất lâm nghiệp*". The term "forest land" may be confusing as it suggests that the designated land has an existing forest cover.

[21] It includes land used for the construction of projects e.g. in the fields of industry, science and technology, transports, irrigation system, culture, education, health, sports; land for national defence and security; land for exploration and exploitation of mineral resources; land of historical and cultural heritage and picturesque landscapes; land for cemeteries, and land with water surface used for purposes other than agriculture.

the total NMR area (GSO, 2006). On the contrary, the areas of agricultural land and land planted with cereals are low, constituting respectively 15 per cent and 11 per cent of the region (Table 3-3).

Table 3-3. Figures on land classification, forest cover and land use in the NMR by province

	Total area* (1000 ha) (2006)	Percentage of agricultural land * (%) (2006)	Percentage of forestry land† (%) (2006)	Forest cover† (%) (2006)	Percentage of land with planted cereals* (%) (2005)
Whole country	**33121.2**	**28.4**	**55.8**	**38.9**	**25.3**
NMR	***10155.8***	***14.6***	***73.7***	***45.7***	***10.7***
North-east	***6402.4***	***15.3***	***73.1***	***49.0***	***12.2***
Ha Giang	794.6	*18.6*	81.1	46.9	10.0
Cao Bang	672.5	*12.4*	85.0	48.2	9.8
Bac Kan	486.8	*7.7*	79.7	54.5	7.3
Tuyen Quang	587	*11.9*	75.9	63.3	10.3
Lao Cai	638.4	*12.1*	65.5	46.4	8.3
Yen Bai	689.9	*11.5*	76.7	54.7	8.0
Thai Nguyen	354.7	*26.4*	50.0	46.5	24.2
Lang Son	833.1	*13.5*	83.6	43.2	8.2
Quang Ninh	609.9	*9.0*	70.8	46.0	8.8
Bac Giang	382.7	*32.5*	46.7	40.9	33.3
Phu Tho	352.8	*27.9*	55.4	47.4	26.5
North-west	***3753.4***	***13.3***	***74.8***	***40.2***	***8.2***
Dien Bien	956.3	*12.4*	80.4	39.2	6.8
Lai Chau	911.2	*8.5*	85.8	37.7	5.1
Son La	1417.5	*17.5*	65.6	41.1	8.5
Hoa Binh	468.4	*11.9*	69.9	44.2	16.5

*Sources: *GSO, 2006, †Forest Protection Department (FPD), 2006*

Major crops are rice, sweet potatoes, maize, tea, peanuts, mungbeans and soybeans (Nguyen Thi Chuc *et al.*, 2006). In the lowland areas, annual crops (usually rice) are preferentially cultivated, whereas both annual and perennial crops are cultivated on sloping lands. Legume crops such as peanuts, soybeans and mungbeans are sometimes grown after rice during winters. Most agriculture is family-based, i.e. the agricultural production unit is the household.

Over the past 20 years, farming systems and livelihoods have greatly changed under the institutional and economic reforms induced by the Doi Moi, the renovation policy initiated in 1986 (see Section III.1.2 in this chapter). Agricultural yields and production have increased and there has been a gradual shift from subsistence to commercialised production (Nguyen Thanh Lam *et al.*, 2004). Yet food security remains a concern in many areas, particularly those least accessible of the north-west sub-region. The NMR and the north-west in particular have poverty levels higher than the national average (Table 3-4).

Table 3-4. Incidence of poverty[22] in the country and in the NMR by sub-region (%)

	1993	1998	2002
Country	58.1	37.4	28.9
NMR	81.5	64.2	43.9
North-east	86.1	62.0	38.4
North-west	81.0	73.4	68.0

Sources: Vietnam Household Living Standard Survey (VHLSS) 1993, 1998 and 2002 in Swinkels and Turck, 2004

In the NMR, most ethnic minority groups have historically cultivated terraced wet-rice fields or grown corn, upland rice or cash crops with slash-and-burn cultivation (or swidden agriculture). Slash-and-burn cultivation generally refers to "an agricultural land use relying on fire for land clearance, whether that land was originally covered with trees, bushes, scrub, or grass" (De Koninck, 1997, p. 19). As this definition indicates, slash-and-burn cultivation does not necessarily imply forest loss. A distinction has usually been made between two forms of slash-and-burn. The traditional form, called "rotational shifting cultivation", relies on a succession of cultivation periods lasting two or three years at the most and fallow periods lasting 10–15 years, if not more. It implies the shifting or displacement of fields and in some cases, but not always, that of the populations practising it. The second form involves the clearing of forest or bushes followed by permanent cultivation using ploughing, and is more prone to affect soil structure and quality. After cultivation, fields are abandoned and new parcels of lands cleared. The latter form of slash-and-burn cultivation has been considered to be harmful for the environment, as it is considered that its shifting pattern

[22] The poverty line for these figures is based on a minimum consumption of 2100 calories per capita per day and a set of basic non-food items, less than 30 percent were below such a poverty line in 2002.

is not part of a rotational system based on extensive cultivation that allows the land to regenerate (Fujisaka *et al.*, 1996; De Koninck, 1999).

In the midlands, farmers have commonly practised composite swiddening, a type of farming system which integrates both permanent wet-rice fields and rotating swidden plots. This example of farmers' diversification strategy includes several components such as wet-rice fields, livestock, fish ponds, uplands for cash crops cultivation and grazing, and gardens to grow fruit trees. In the lowlands, farming activities are diversified, and usually include wet-rice cultivation and husbandry. There are also more opportunities for off-farm employment, e.g. construction works.

Both swiddening and slash-and-burn cultivation rely on common-property arrangements. Land needs to be managed by the community or a group of households in order to allow the rotation of cultivated fields and long fallow periods. In **Chapter 4**, the impacts of FLA regulations imposing an individual property scheme on upland management are examined. Conversely, lowland fields have been managed by households as an individual production unit since the end of the communist cooperative system (cf. Section III in this chapter). Water management for the paddy fields however requires some form of cooperation among households to share irrigation water between neighbouring fields.

I.3. Contribution of forest to upland livelihoods

Under the region's wide range of climatic conditions, forests compose a highly diverse set of ecosystems, including mangrove forest, bamboo forest[23], evergreen forest, semi-deciduous forest, mixed evergreen coniferous forest, muddy forest and sub-alpine vegetation (FAO, 1981; Clarke, n.d.). Generally, nature has not been perceived and valued in the same way over time and over space. The perception and importance of forest for upland people is all the more likely to vary under biophysically diverse ecosystems. Depending on time, people and places, some natural forests have been perceived as feared wild spaces inhabited by fierce animals[24] (DiGregorio *et al.*, 2003). Forests have also been linked with religious and ritual practices. Generally, they

---

[23] Bamboo forests are according to de Koninck (1999) a degraded form (or at least an intermediate form) of forest.
[24] For instance, tigers and wild pigs threatened domestic animals and agricultural crops.

have been valued by local people as a source of fuelwood[25], timber for housing construction, Non-Timber Forest Products (NTFPs) such as banana leaves, bamboo shoots, medicinal plants, and for the fauna it shelters. According to the Government of Vietnam (GoV), Vietnam's forest-dependent people rely on forest resources for an average of 20 per cent of their total (monetary and non-monetary) income (GoV, 2005). As it is discussed further in this dissertation, and particularly in **Chapter 7**, the value given by local people to forest and uplands is very distinct from that of central policy-makers. The latter are in great majority of the Kinh ethnic majority group who have historically settled in lowland areas, staying away from the forests (De Koninck, 1999).

Although the forestry sector was of critical importance during the Vietnam War, it does not presently formally contribute an important amount to the national economy – roughly one per cent of the Gross Domestic Product (GDP) (MARD, 2005a). Its economic importance is nonetheless substantial in some provinces, particularly in Central Vietnam where large State Forestry Enterprises (SFEs) are engaged in timber trade with Laos. SFEs are logging companies, established by the socialist State in the 1960s. They range from small exploitations managing forest plantations to large exploitation and production units including wood processing companies. The largest SFEs lie under the management of the central company VINAFOR, whereas small wood-processing enterprises are commercial sub-units of VINAPIMEX, the state-owned paper corporation, which is the most important industrial player in the forestry sector (Barney, 2005).

In the NMR, forestry has a relatively important economic role compared to the national average (Table 3-5). Yen Bai Province stands out in this respect, due to the presence of the Bai Bang (*Bải Bằng*) paper mill[26], the largest production unit of VINAPIMEX, since 1995.

---

[25] Fuelwood is the major source of energy for many people living in remote mountainous areas (de Jong *et al.*, 2006).
[26] The mill was built thanks to the support of the largest aid project in the history of Swedish assistance.

Table 3-5. Figures on forestry in the NMR by province in 2006

	Output values of forestry constant price 1994 (billion VND[†])	Output values of agriculture constant price 1994 (billion VND)	Ratio output values of forestry / agriculture
Whole country	6315.6	137,112.0	0.05
NMR	2,559.0	14,219.1	0.18
North-east	1,923.2	11,147.1	0.17
Ha Giang	133.9	709.7	0.19
Cao Bang	128.1	714.7	0.18
Bac Kan	96.5	354.5	0.27
Tuyen Quang	189.8	790.3	0.24
Lao Cai	174.8	613.6	0.28
Yen Bai	333.6	756.1	0.44
Thai Nguyen	70.0	1,297.4	0.05
Lang Son	385.9	956.1	0.40
Quang Ninh	118.4	965.8	0.12
Bac Giang	123.5	2,427.9	0.05
Phu Tho	168.7	1,561.0	0.11
North-west	635.8	3,072.0	0.20
Dien Bien	132.3	442.1	0.30
Lai Chau	76.9	292.6	0.26
Son La	231.3	1,438.0	0.16
Hoa Binh	195.3	899.3	0.22

[†] Vietnamese Dong. 1USD approximately equals 16,500 VND (exchange rate, May 2008)
Source: GSO, 2006

The contribution of the forestry sector to household incomes is estimated at respectively 11.7 and 23.0 per cent in the North-east and North-west (Figure 3-2).

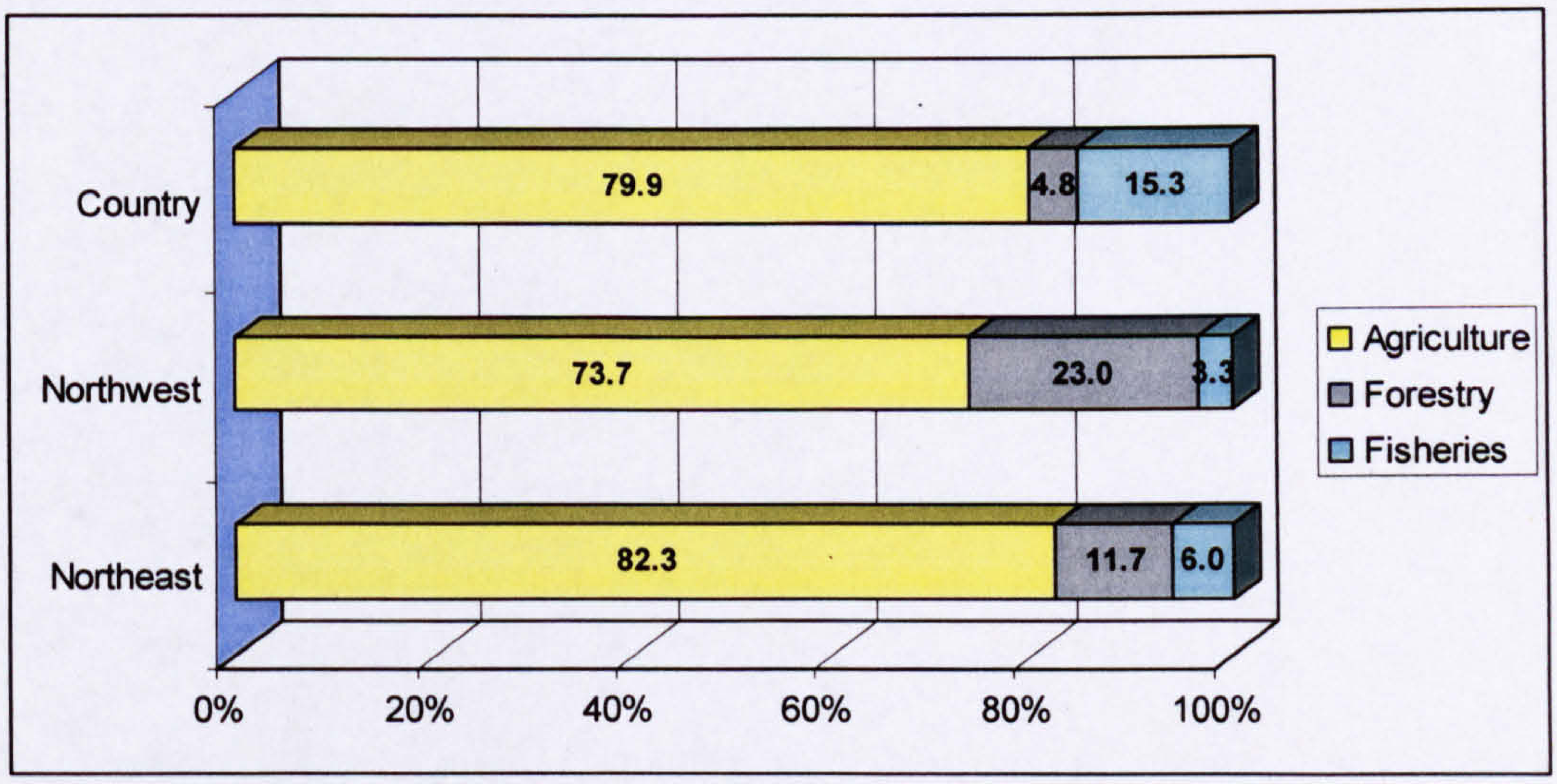


Figure 3-2. Contribution of agriculture, forestry and fisheries to household income in the NMR
Source: (Nguyen Sin Cuc, 2003 in de Jong et al., 2006)

Although not important yet, forestry is intended to be so in the very near future. Under an increasing national and international demand for timber, there is a strong political will to expand plantations and develop the Vietnamese wood processing industry (De Jong *et al.*, 2006a). The demand for raw material of the pulp and paper industry is a key factor in forest plantation planning (De Jong *et al.*, 2006a); in 2004, Vietnam imported raw timber for a value of USD 350 million. The National Forestry Development Strategy (NFS) 2010-2020 (Prime Minister of the Government of Vietnam, 2007b) predicts that the deficit between forecast national forest product consumption and production will substantially increase in the coming decade, which the GoV hopes to reduce through the expansion of forest plantations.

I.4. Change in forest cover

It is difficult to provide estimates of forest-cover change over a large time period in Vietnam as figures are extremely disparate. The reference date commonly used in all estimations of forest-cover change is 1943, with a figure of 43 per cent of forest cover (MOF, 1991; e.g.Vo Quy, 1996). However, the World Bank Environmental Programme and Policy Priorities report (1995b) indicates a figure of 67 per cent of forest cover in 1943. De Koninck (1999) evaluates forest-cover decrease from 55 per cent in the late 1960s to 17 per cent in the late 1980s, whereas the Forest Inventory and Planning Institute (FIPI) figures report a decrease from 36 per cent in 1973 to 25 per cent in 1985 (FIPI in World Bank, 1995a). In the early 1990s, there were still high differences among forest-cover evaluations: the GDLA indicated a figure of 28 per cent in 1993 (GDLA, in World Bank, 1995a) whereas Vo Quy (1996) gave an estimate of 20 per cent.

Some estimates give rise for major concern about the rate and extent of deforestation: the World Bank Environmental Programme and Policy Priorities report indicated that forest cover in the NMR had reduced from 95 to 17 per cent between 1943 and 1991 (1995b). According to Mellac (2000) however, there is no valid reference to assess forest cover before the 1960s in Vietnam. The most commonly found figure of 43 per cent of forest cover in 1943 is an estimation from Maurand's maps, whose reliability is, according to Thomas (1998), questionable. First, this figure would actually date from 1930. Second, other sources provide a much lower estimation: 35 per cent in 1918 and 31 per cent in 1937 (see Mellac, 2000, p. 73). Other historical accounts suggest caution as regards estimating deforestation rates: deforestation is said to have particularly concerned primary forests, which were evaluated in 1990 as comprising only 8 per cent of the forested land in Vietnam (FAO, 1993). Yet French authors reported as far back as the period 1920-1940 that no primary forest remained in the Tonkin region (Thomas, 1998). The need to have a critical look at accounts of deforestation is even more obvious when one realises that figures and discourses differ according to the audience they are directed at (see also Lang, 2001, p.113). For instance, the MARD review on rural development does not mention any deforestation problem in Vietnam but instead states that the "covering rate of forests in Vietnam is rather high and rational, limiting the flows from land surface right after rains, alleviating flood ..." (MARD (Ministry of Agriculture and Rural Development), 2005b). This review is directed at an audience of funding international organisations[27], and aims to show that Vietnam holds a fauna and flora worth preserving "Vietnam possesses various natural resources, diversified forests and special ecological systems... The discovery of 2 hoof kinds of Sao La and Mang Lon in Vietnam can eloquently prove the diversity and variety of Vietnam creature" (*ibid.*). It contrasts with other discourses depicting a country highly devastated by widespread deforestation.

This is not to argue that there has not been a decrease in forest cover over the last decades or that deforestation is not an issue of concern in the region. But a close examination of historic sources suggests that: (1) the extent of the deforestation process that has occurred between the 1940s and 1990s might have been exaggerated since the figure which is commonly used as the reference point of a pristine forest in Vietnam is questionable; and (2) deforestation might not have followed a linear and downward trend over time as often depicted, but rather a sequence of decreases interspersed with periods of expansion in cover (Mellac, 2000). It implies that causes for deforestation might be diverse and time dependent, rather than attributable to a single factor.

The direct causes of deforestation most commonly cited in government and donors reports (World Bank, 1995a; MARD and 5MHRP Partnership, 2001; DiGregorio *et al.*, 2003) have been agricultural expansion, and more particularly shifting cultivation, fuelwood consumption, commercial logging and fire damages. In his study of deforestation in Vietnam, de Koninck (1999, p. 15) identified four "instrumental

[27] This is a personal assumption as themes tackled in the review are livelihoods, gender, governance and natural resource management, which are the current buzz words to attract funding.

factors": (1) excessive practice of swidden agriculture; (2) agricultural expansion; (3) legal and illegal logging; and (4) collection of various forest products for subsistence needs. Often, the role of ethnic minorities has been exaggerated (Do Dinh Sam, 1994; De Koninck, 1999; Lang, 2001).

Figure 3-3 presents figures of forest cover in North Vietnam. For the reasons previously outlined in this section, caution is advised when interpreting such figures (particularly considering that the boundaries of provinces forming the NMR have changed over the time period considered).

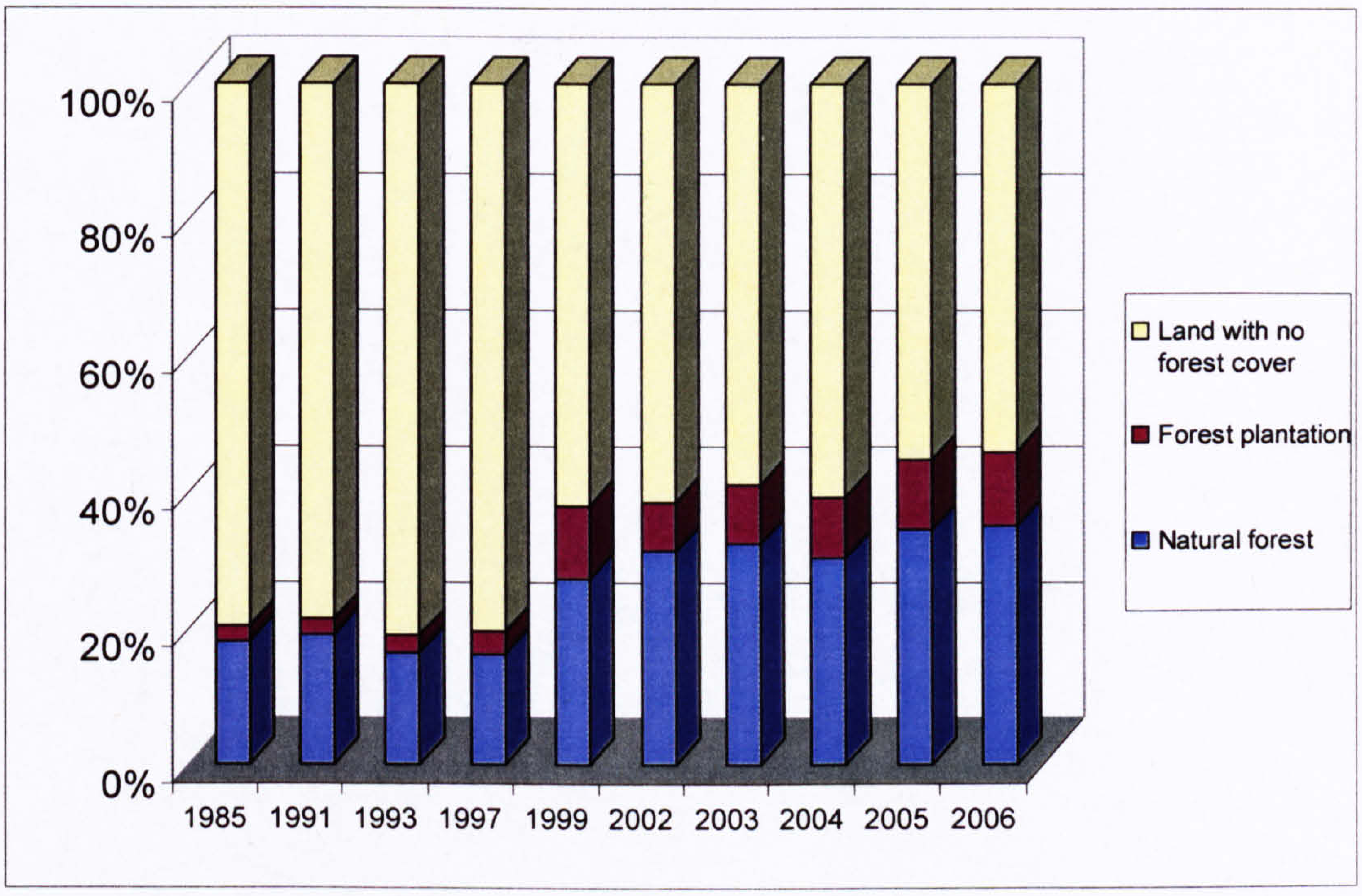


Figure 3-3. Evolution of forest cover in the NMR by forest type (natural and plantation)
Sources:
Years 1985, 1991 and 1993: GDLA in World Bank (1995a)
Year 1997: Do Dinh Sam (1998) (FIPI figures)
Years 1999 and 2002-2006: FPD (www.kiemlam.org.vn)

Official statistics have reported a slight increase of the national forested area since the 1990s, from 30 per cent of the total area in 2000 (FAO, 2000) to 38 per cent in 2007. These figures have been challenged by some observers (Sunderlin and Huynh Thu Ba, 2005). Furthermore, the quality of the newly forest cover is reported to be low (MARD and 5MHRP Partnership Secretariat, 2001; ADB, 2007). Whereas causes of afforestation have been attributed by the GoV to the state afforestation campaigns initiated since the 1990s, Meyfroidt and Lambin (2008) have proposed a more nuanced explanation: although land allocation to households and local scarcity of forest products have partly contributed to afforestation, more essential factors would be smallholder agricultural intensification and the resulting concentration of agricultural production on the most suitable lands.

The next chapters examine the actual contribution of state initiatives in forest-cover increase. But before moving into the analysis of afforestation policies, it is important to understand the institutional context and the governance system aiming at regulating the relationships among upland people, forest and land.

II. Governance system

II.1. The Party-State

The State in Vietnam is dominated by a single party system; rival political organisations to the Communist Party of Vietnam (CPV) are systematically rejected. Because the Party and the State apparatus are intrinsically linked and overlapping – it is indeed often difficult to distinguish between them (Koh, 2001) – the term Party-State is used in this study to refer to the whole set of State and Party organisations. The direct control of the CPV in State affairs has been reduced since the beginning of the political and economic reforms initiated in 1986 by the Doi Moi policy (Shanks *et al.*, 2004), but the CPV is still omnipresent at every layer of the governance system, and retains a primary role in important political decisions (Abuza, 2001). It designs the national strategic orientations and guidelines for the government to follow, and appraises policies. For instance, the Doi Moi policy, which is considered as the most important political-economic reform of the last decades in Vietnam, stems from a resolution of the Party National Congress. However, it would be misleading to conceive the State as tightly controlled by the Party (McCarty, 2001). The State holds a relative freedom in designing and implementing policies, as long as they are in line with the strategic orientations of the CPV. The latter nevertheless intervenes when it feels its legitimacy is threatened.

According to Porter (1993), power over the determination of major policies and the selection of political and governmental leaders is concentrated in the hands of a few party officials. Strategic vision and orientations for the country on a long-term basis are defined by the CPV and articulated during the Party Congress every five years. All legal documents are in line with the Party's guidance issued in the Party's Congress document. The President, head of the state and chief of the armed forces, and the Prime

Minister are elected by the National Assembly (NA)[28]. The Prime Minister nominates the ministers who form the cabinet-style government, issues instructions for the Ministers to follow and chairs the central government. The NA, established by the Constitution of 1992, is chosen by direct election every five years. First considered as a rubber stamp for governmental and party decisions, it has progressively gained more importance. Meeting four to five weeks twice a year (compared to three to six days each year in the 1980s), it can raise critical questions to ministers and ask for policy revisions (Hy Van Luong, 2003). However, its actual ability to challenge the most crucial policies remains under question (Abuza, 2001; Shanks *et al.*, 2004). Figure 3-4 presents the basic formal structure of the policy-making process.

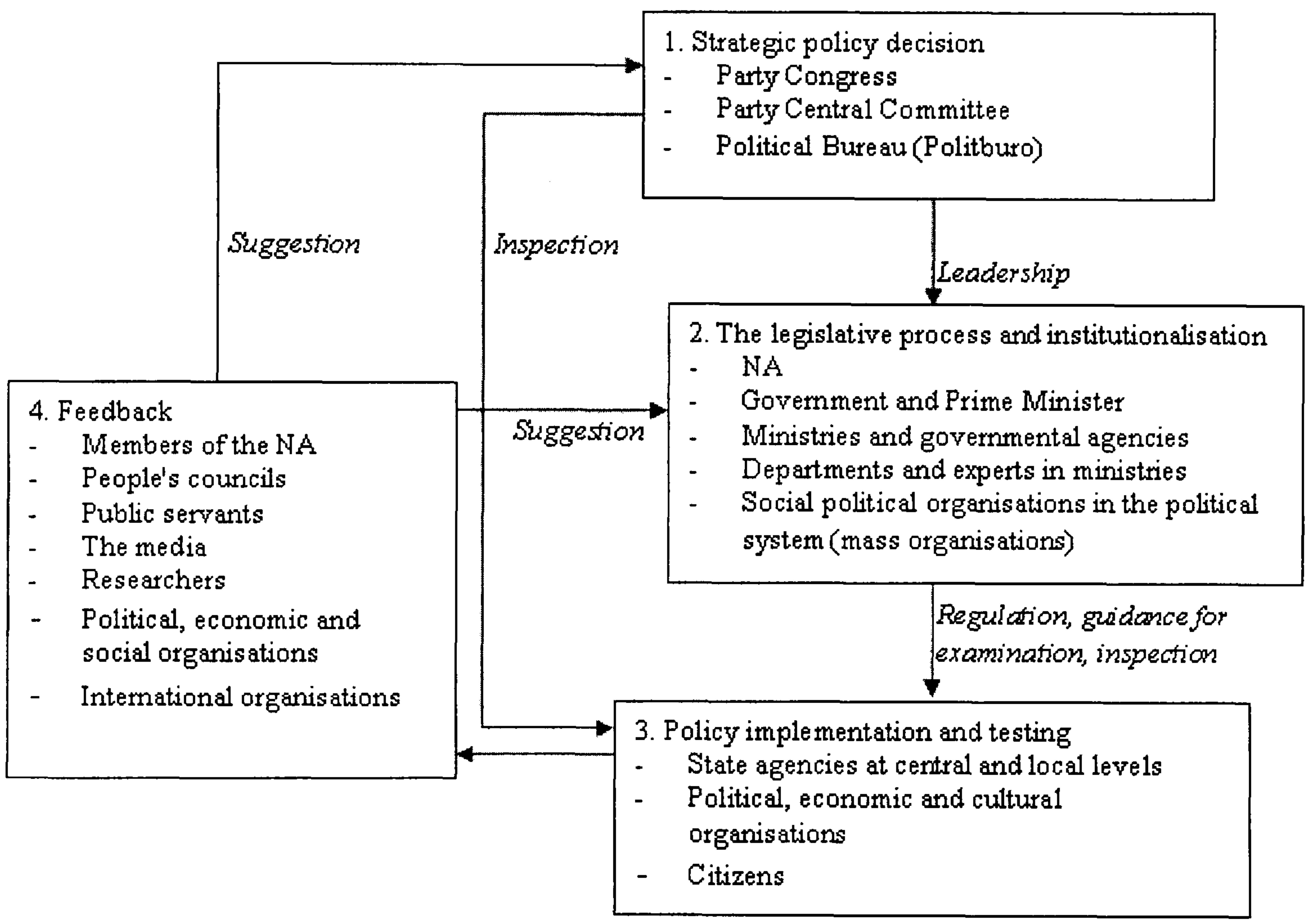


Figure 3-4. Formal structure of the policy-process in Vietnam
Source: McCarty, 2002, adapted from Vu Hoang Cong, 2001

The Party apparatus and administrative State system extend in parallel from the central to the village level (Figure 3-5) according to a highly deconcentrated administrative structure. Each commune, which is the smallest administrative unit, is bound to the district, and then province and central level. People's Councils, who are directly elected by the Vietnamese constituency, and People's Committees are

[28] The Prime Minister is presented to the NA by the President.

respectively the legislative and executive bodies at the local administrative levels (province, district and commune). In practice, most decision-making power is held by People's Committees who are given both budgetary and administrative power (Kerkvliet, 2004; Shanks *et al.*, 2004).

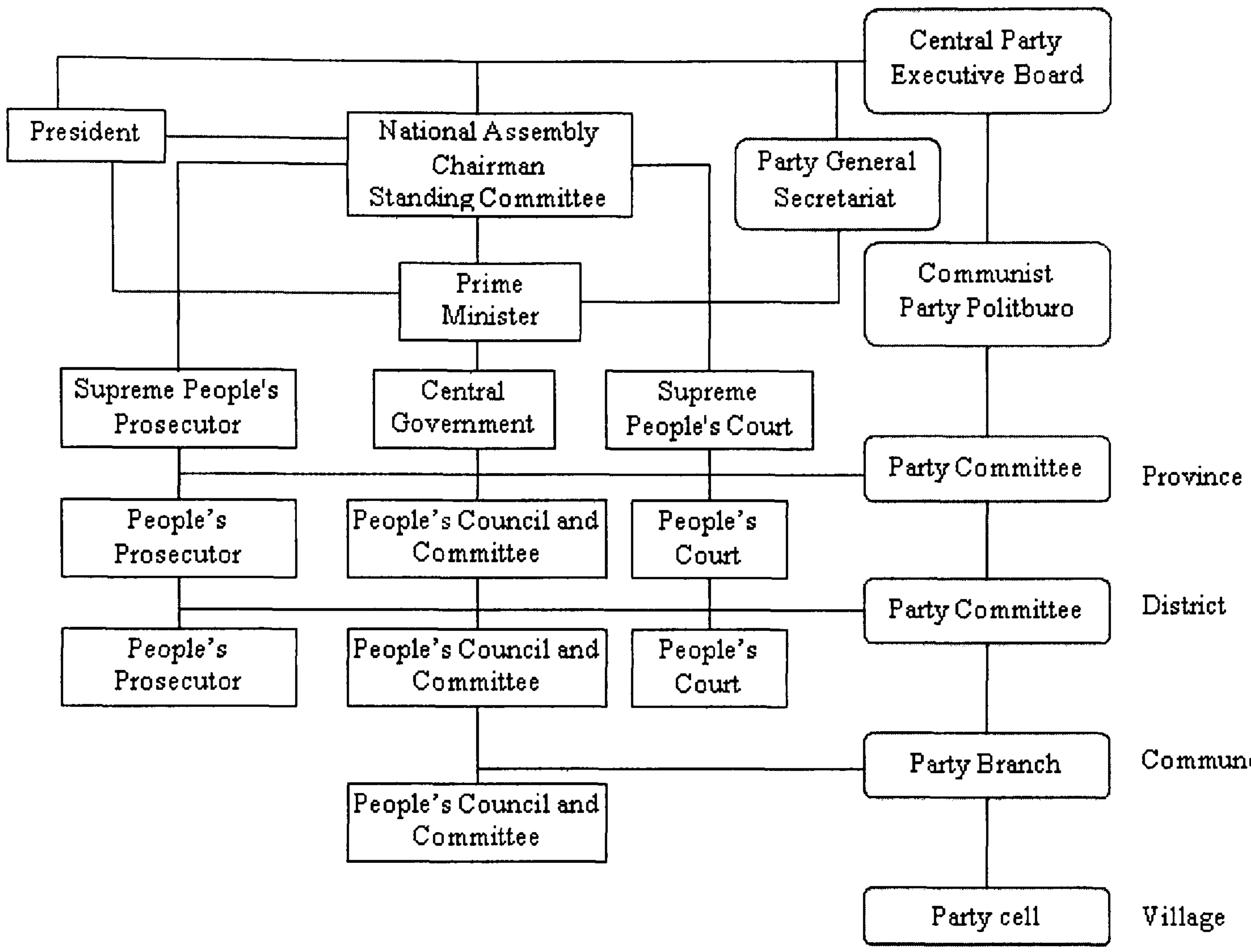


Figure 3-5. Party-State structure of the Socialist Republic of Vietnam (Adapted from: UNDP, 1999; McCarty, 2002)

There are close linkages between the Party and the State at every administrative level. For instance, at the provincial, district and commune level, the Party controls the election process of the People's Council and its activities. At the village level, candidates for the village head position must also be approved by the Party cell. In addition, Party members are placed in strategic positions in state administrations. Notably, senior staffs in the central government, including President Nguyen Minh Triet and Prime Minister Nguyen Tan Dung, are members of the Central Committee and Politburo. Besides, Party members represent a very large majority of elected representatives sitting in the NA (90 per cent of the current Assembly elected in May 2007 comprises members of the CPV).

Outside the state apparatus, the Party is also involved through close links with the Fatherland Front (*Mặt Trận Tổ Quốc*), an umbrella organisation to which are affiliated mass organisations. Mass organisations were established by the Party-State in the 1960s. Replicated at every administrative level from the central to the village level, they aim to include every strata of the population: they include the Youth Union, the Women's Union and the Peasants' Association[29], the Elders' Union, the Veterans' Union and the Soldiers' Association. They fulfil several roles: mobilise people to support the Party-State policies, keep control over social and economic groups and channel, through a secure means, the protests and opinions of the represented population (Kerkvliet, 2001). In the NMR, they replaced traditional institutions of ethnic minorities, considered backward by central cadres (Poffenberger and Nguyen Huy Phon, 1998). Lastly, the CPV is present in the civil society through State-Owned Enterprises. Its integration in the private sector has been more limited.

Section II.2 details the role and responsibilities of political actors in the design and implementation of state policies. In reality, the boundary between policy design and implementation is blurred: many political actors are involved simultaneously in several institutional arenas. It is not unusual that a cadre from the Provincial People's Committee (PPC) is a member of the central CPV and acts both at the collective-choice and constitutional level.

II.2. Implementation of forest and land policies

Forest and land are legally considered in Vietnam as two distinct entities and as a consequence are under the responsibility of two ministries at the central level. While water and land management are under the responsibility of the Ministry of Natural Resources and Environment (MONRE)[30], forest management is under the responsibility of the MARD. Within the MARD, two professional departments are responsible for forest issues: the Forest Protection Department (FPD) and the Forestry Department. Table 3-6 gives an overview of the major actors in charge of implementing forest policies and managing forest and land.

[29] In general, young men and women leave the Youth Union to be members of the Women's Union / Peasants' Association once they get married.

[30] Land management was until 2002 managed by the GDLA, then integrated in the MONRE when the latter was created.

Table 3-6. Actors legally involved in forest and land management at the three institutional levels[31]

Actors	Institutional level: Operational situation	Collective-choice situation	Constitutional situation	Geographic area
Central government (Prime Minister, ministries and other state agencies)		*De jure*: Designs implementing decrees, resolutions, decisions, directives, circulars *De facto*: Also designs laws	*De facto*: Decides on who implements and how are implemented legal documents (e.g. defines the degree of freedom that provincial authorities have to implement)	National
Provincial cell of the Communist Party / Provincial People's Council / PPC		The PPC implements rules for forest and land management (e.g. classifies land and allocates protection forest and forestry land).	Decide provincial resolutions and directives on how policies are implemented and which department implements them	Province
Provincial technical Departments		Control and enforce land use regulations (e.g the FPD controls illegal logging).	Supervise the implementation of provincial guidelines	Province
District People's Committee and technical Departments		The District People's Committee implements rules for forest and land management (e.g. allocates production forest and forestry land). Control and enforce land use regulations.	Implement the provincial guidelines with relative freedom	District
Commune People's Committee		Implements the district guidelines with relative freedom. Control and enforce land use regulations		Commune
SFEs	Forest and land use (e.g. forest plantation, protection, enrichment, exploitation and processing)	Might implement national guidelines on special-use forests and FLA		Owned area
Communities / Households / Individuals		Might craft their own community rules	Might define who crafts and how community rules are crafted	

Source: this study

At the provincial level, the Party and People's Committee issue guidelines defining the implementation of central decisions in their territory. The provincial departments are the executing arms of the PPC. They are in charge of "state management" (*quản lý*

[31] These actors are grouped according to their official administrative tasks but it does not imply that they have congruent preferences and pursue similar objectives.

nhà nước) which means that they apply central policies and control their implementation. They delegate most implementation to district authorities and coordinate and control their actions on the field. They also have a role as technical advisor and knowledge base to the PPC.

The provincial Department of Agriculture and Rural Development (DARD) is more particularly in charge of forestry planning. At the provincial level, the Forestry Department is a sub-department of the DARD responsible for the implementation of the 5MHRP, coordinating local programme management committees at the district level and controlling the implementation of the programme by SFEs. Although the FPD is a Department of the MARD at the central level, it is often located directly under the authority of the PPC, and has thus a position equivalent to the DARD at the provincial level. The provincial FPD supervises the actions of local forest protection officers who are in charge of forest protection on the field. In some provinces, it has been in charge of FLA. The FPD has recently been entitled the task of forest monitoring and evaluation. It receives and compiles the changes in forest reported by all forest owners at the local level. The Department of Natural Resources and Environment (DONRE) is in charge of land planning and administration (e.g. issuing the land certificates). It has also been in charge of implementing land allocation in some provinces. The provincial departments are *de jure* accountable both to the PPC (for human resources and budget) and to the Ministry (for technical aspects). *De facto* they are much more accountable to the PPC as the latter decides on budget, recruitment and individual promotion. Districts and communes act as the policy implementers on the ground and have *de facto* relative freedom for adapting and negotiating policies with local people (EASRD, 2004).

Provinces have relative freedom to implement central policies within their administrative boundaries. It is linked to a long Vietnamese historical tradition of provincial autonomy (Grossheim, 2004), which has been reinforced by the recent decentralisation process that accompanied the Doi Moi reforms. On the one hand, decentralisation has been restricted to the delegation of administrative tasks and has not encompassed the devolution of decision-making power (Dupar and Badenoch, 2002; Zingerli, 2003) (thus taking the form of deconcentration). On the other hand, the GoV is often described as weak (Fforde, 1997 in McCarty, 2002). Central authorities have a limited ability to impose their will upon lower levels and there is great room for interpretation of central laws at the provincial level (Dupar and Badenoch, 2002; McCarty, 2002) and for negotiation at the local level (Kerkvliet, 2003; Sikor, 2004). The provinces least relying on the central budget hold significant power over policy-making.

There have been substantial discrepancies among provinces in the way forest policies have been implemented. The land policy area accounts for the largest number of reported "fence-breaking"[32] incidents in the daily newspapers between 1990 and 2000 (Malesky, 2004). Disparities in FLA have ranged from deliberately slow implementation, slight adaptations, and amendments – e.g. Son La Province amended the 1993 Land Law in 1994 (Decision No. 109/QD-UB) to allocate land to communities rather than to households – to non implementation – e.g. Hoa Binh Province has not implemented Decree 163/1999 yet. The Party "averts its eyes" as long as it does not clash with its strategic orientations. When it does, provinces might be sanctioned. Nevertheless, some provincial initiatives that were initially criticised by the central Party-State have since been taken as models and have led to a law revision[33] (Malesky, 2004).

SFEs are key actors in the forest arena. Their role has dramatically changed over the last 20 years. In 1991, their management was decentralised from the central government to provincial and district authorities. Their economic activities have then been dramatically affected by the logging ban of natural forest issued in 1994 and by the reallocation of forest resources and the devolution of forest management to households. Since then, their activities have been progressively re-oriented towards the provision of services. They also currently act as implementing units of the 5MHRP by contracting with households for forest protection, regeneration and plantation. The reforms induced by Decision 187/QD-TTg in 1997 aim to transform SFEs into commercially viable and autonomous business units. Because of the slow progress of the reform, a new decree was issued in 2004 (Decree 200/2004/ND-CP) to re-affirm that non-viable SFEs will be either dissolved or transformed into a Management Board for Protection Forest (MBPF), a state organisation in charge of protecting and managing protection forest areas.

---

[32] Fence-breaking is used here to describe acts of autonomy (Malesky, 2004).

[33] For example, the use of the land-use certificate as collateral for bank loans by private companies in a few provinces was first criticized by the central government but then integrated in the Land Law of 1999 (Malesky, 2004).

II.3. Interaction between the population and the governance system

II.3.1. Democratic centralism

Democratic centralism is the principle that dominates the political life and culture in Vietnam (cf. the 1992 Constitution of the Socialist Republic of Vietnam, (National Assembly of Vietnam, 1992)). Pluralist opinions can theoretically be freely expressed and discussed at every level. According to this principle, these opinions have to be taken into account by the Party-State to take decisions, but once a decision has been made, the latter must be followed by all Party members and citizens (Abuza, 2001). Citizens have officially a voice through elected representatives at the NA and the People's Council. Meetings with People's Councils are organised annually in every village to collect people's claims. But most farmers are reluctant to criticise policies during public meetings (Zingerli, 2003) and think that even if they do it, it will make no difference. Mass organisations and other forms of associations (cf. Vasavakul, 2003) are not places where popular dissent can be expressed (McCarty, 2001). However while all forms of civil organisations are tightly controlled by the Party-State, the Grassroots Democracy Decree No. 29/1998/ND-C on the exercise of democracy in the communes (GoV, 1998) has opened a new window for formal democratic participation. It intends to increase the accountability of People's Committees to People's Councils and local people at the commune level. However, outcomes are still limited and mixed (Zingerli, 2003; Kerkvliet, 2004) – some observers argue that the application of the decree has reinforced the power of local cadres rather than devolving decision-making power to the local population.

Kerkvliet (2001; 2003) argues that State-society relationships in Vietnam are a combination of:

1. A dominating State: rules and programmes are carried out by and within the State with the control and supervision of the Party;
2. A State driven by mobilisational corporatism: forces in society influence policies through organisations that the state itself dominates; and
3. A decentralised and dialogic State: there are difficulties for the State to implement policies at the local level, and considerable negotiations occur between local and central authorities.

Vietnam adopts many traits of the dominant State model. Major political decisions are made within the bureaucracy and non-state institutions have no impact on the making and implementation of the policy. However, the second view proposed by Kerkvliet (2001) recognises the influence that social forces have through official channels and mass organisations, established and dominated by the State itself. Mass organisations have, for example, helped the government to inform and persuade the population during national campaigns on social issues such as drugs or prostitution. The Peasants' Association has also at several occasions strongly defended its members' interest, for instance during the 1993 Land Law elaboration (Kerkvliet, 2003).

The third interpretation suggests that several forms of dialogue, even though not well-balanced and not formally recognised as such, exist between the state and the population: Informal networks or institutions can influence major policies through the violation of laws and expression of collective concern. Informal arrangements can occur between local cadres and ordinary citizens to bypass laws. Many local cadres in the NMR have kinship links with villagers. They often spend their entire career in the same locality and their wages and career progress depend on local bodies. In practice, they are often more accountable to the local population than to central authorities. The most striking example of this third interpretation is the shift from collectivised agricultural production to household-based farming. Kerkvliet argues that it emanated from the continuous tensions between the population and local authorities. Farmers expressed their dissatisfaction in a subtle and non-confrontational manner until they significantly annoyed local authorities and negotiated arrangements to by-pass the collectivised system. Kerkvliet (1995) suggests that the difficulties encountered by local authorities to maintain cooperatives contributed greatly to the elaboration of land reforms by central policy-makers. Other examples include the legalisation of strikes after public demonstrations in the early 1990s and the revision of laws on building and renovated dwelling further to the widespread violation of state rules by urban residents (Kerkvliet, 2003).

Dixon (2004) has a similar view on the political regime in Vietnam, which he qualifies of soft authoritarian corporativism: the Party-State tightly controls the political life but is reluctant to go substantially against the perceived view of the people. According to several observers (Koh, 2001; McCarty, 2001; Shanks *et al.*, 2004), the Party-State has to concede power and be responsive to people's claims to conserve its legitimacy. It was particularly observable at the time of large peasant protests against local corruption in 1997 in the provinces of Thai Binh (*Thái Bình)* and Dong Nai (*Đồng Nai).* According to Kerkvliet, the State did not use coercive means to stop the protests but showed a real concern to people's protests and initiated an investigation on the causes of this rural unrest (Shanks *et al.*, 2004). This investigation resulted in the sanctioning of more than 2,000 civil servants and to several legal changes including the 1998 Grassroots Decree. The Party-State also reacted rapidly to civil unrests in the Central Highlands in 2001. However, in the example of Thai Binh Province, villages had repetitively sent letters of complaints from 1994-1995 through formal channels, and had started protesting from 1996 with no response. The Party-State finally reacted in 1997 because of the scale of the manifestation and its concern for its publication and propagation.

Lastly, the Party-State's control over public and social issues such as rituals and religions, migration and gender relations has greatly decreased (Hy Van Luong, 2003). For example, the GoV has gradually abandoned strict programmes of fertility control and family planning to develop a policy that focuses on information delivery that favours free and well-informed choices (UNDP, 2001). As a conclusion, despite the omnipresence of the CPV on the political stage and its control over a large piece of the political system, there are indications of a developing dialogue between the Party-State and wider society on a range of policies. However, still only one player – the Party-State – defines the rules-in-use and forms of this dialogue.

II.3.2. Corruption

Corruption is unfortunately a major characteristic of the governance system in Vietnam (World Bank *et al.*, 2004). Vietnam was ranked 111th out of 163 countries (the 163rd being the most corrupt) in the most recent report of Transparency International (2006), the leading global institution monitoring and measuring corruption. Recent studies (e.g. from the Party's Central Committee on Internal Affairs released in 2005) indicate that corruption is prevalent at every level of government. Common forms of corruption include soliciting and accepting bribes and using public means for personal benefit (ADB *et al.*, 2007). According to several international organisations, there is currently a strong political will to fight corruption (ADB *et al.*, 2007). An anti-corruption law was enacted by the NA in 2005 and put into force in 2006. The Socio-Economic Development Plan 2006-2010 also affirmed the need for transparency and government officials' accountability. These positive moves will however most likely require time to lead to tangible results.

III. Political-economic context: a historical perspective

When Vietnam was under French colonialism (from 1859 till 1954), lowland peasants were employees of landlords and did not own land. The control over land use by French colonial institutions was much more limited in mountainous and remote areas: lands, while *de jure* owned by the state, were *de facto* freely used by the population (Poffenberger and Nguyen Huy Phon, 1998). Ethnic minorities pursued management of forest and land through customary law and traditional arrangements under the colonial regime. Resources were managed according to tribal governance structures and customary laws (Poffenberger and Nguyen Huy Phon, 1998).

In 1953, a national land reform was initiated and agricultural lands were confiscated by the state and redistributed among the peasants. One year later, the Geneva agreement created the independent states of South Vietnam and North Vietnam. Table 3-7 summarises the main policy shifts that have affected land users since 1953.

Table 3-7. Major facts and events related to forest and land policies since 1953 (compiled from Liljeström *et al.*, 1998; Poffenberger and Nguyen Huy Phon, 1998; Sikor, 1998; Adger, 1999; Nguyen Nghia Bien, 2001; Dupar and Badenoch, 2002; Hy Van Luong, 2003)

LAND AND AGRICULTURAL POLICIES AND EVENTS		FOREST POLICIES AND EVENTS	
North Vietnam - Socialist period			
1953	Land reform: confiscation and redistribution of lands	**1958**	Start of forest nationalisation Forestry land is managed by SFEs
1957	Start of agricultural land collectivisation		
1960	75% of rural households are members of cooperatives		
1960s	Introduction of modern farming technologies and high-yielding rice varieties	**1968**	Start of the allocation of forestry land to co-operatives
1960-70s	Campaigns to suppress shifting cultivation and settle nomadic populations New Economic Zones Movement: migration programmes from the lowlands to the highlands (4 million people moved in the country)		
Unified Vietnam - Socialist period			
1975-76	Land collectivisation extended to the South	**1975-76**	Forest nationalisation extended to the South
1978-81	Major recession in agricultural productivity Unofficial and local introduction of household contract system in agriculture		
1981	National application of household contract system under Directive 100	**1980s**	Forestry sector under crisis. Allocation of forestry land to households commences
Liberalisation period			
1986	Doi Moi introduced following the Sixth Congress Party		
1988	Land Law: land allocated to individuals for long-term periods; Agricultural products become commodities. Resolution 10: Full contract system of household responsibilities	**1988**	Small forestry land plots (2 ha) allocated for 5 years for management by households
1988	Start of the Programme 135 "Support for the most difficult and remote communes programme": 1,715 communes targeted for infrastructure investments.		
1988–93	Emergence of an illegal rental market for land	**1991**	Forest Protection and Development Law
1990	Introduction of high-yield wet-rice seed varieties, increasingly available fertilisers	**1992**	Decisions No. 264/CT and 327/CT for afforestation and barren land development
1993	Land Law: Land becomes a commodity		Logging ban
1994	Decree 64/1994/CP. Regulations on land allocation: Annual crops allocated for 20 years Perennial crops allocated for 50 years	**1994**	Decree No. 02/1994/CP: Forestry land allocated from SFEs to households, villages and communes. SFEs responsibilities are re-oriented to watershed protection, extension and support services for households.
1998	Grass-roots Democracy Decree Water Law Programme 135 "Hunger eradication and Poverty Alleviation Programme"	**1998**	Decision 661/QD-TTg: implementation of the 5MHRP
2003	Amendment of the 1999 Land Law. Recognition of communities as recipients of land property rights	**2004**	Amendment of the Forest Protection and Development Law. Recognition of communities as recipients of forest and forestry land property rights

III.1.1. Collectivisation

After the extensive land redistribution of the early 1950s, the government of Northern Vietnam decided, following the socialist mode, to progressively collectivise the means of production and to control agricultural inputs and products. Collectivisation processes occurred progressively. Villagers were organised into teams and remunerated in rice and other produce, according to the number of working days, quality and quantity of work, and other criteria (Kerkvliet, 2003). In the 1960s, 75 per cent of households in the North were part of a cooperative (Jamal and Jansen, 1998). Gradually, village cooperatives were consolidated into larger cooperatives[34]. Although the government believed larger cooperatives would enhance productivity, it resulted in crop yields drop and deteriorating living and working conditions. After the end of the Vietnam War (called American War in Vietnam) and Vietnam reunification in 1975, land collectivisation was extended in the south of the country, despite a strong resistance organised by the peasants. Villagers showed little motivation for collective works and agricultural production continued to decline throughout the country.

At the same time that agricultural land was collectivised, land with slopes greater than 25 degrees was classified as land for forestry purpose, nationalised and managed by a system of SFEs. Small forestry land plots were under the control of SFEs and provincial and district administration. Larger ones were under control of the central government and grouped into 15 Forestry Production Unions. In the following years and up until the late 1980s, SFEs played an important role in the economic development of the uplands, providing employment, infrastructures and social services (Sikor, 1998). However, state forestry has also generated conflicts with local people as the use of forests managed by SFEs has been exclusively restricted to state exploitation and forbidden to communities.

In 1968, the newly established Department for Fixed Cultivation and Sedentarisation started to implement programmes to stop swidden farming and settle nomadic upland populations. The GoV provided funding for housing and sedentarised farmers also received subsidies (e.g. for agricultural inputs) and tax exemptions (Sikor, 1998). In the 1960s, large migration programmes to displace Kinh from the heavily

[34] From the early 1960s through to 1970, the number of cooperatives in Northern Vietnam dropped from approximately 44,000 to 19,000 because of consolidation (Kerkvliet, 1995).

populated Red River Delta Region to the northern uplands took place; the population of Kinh people in the NMR grew from 640,000 in 1960 to 2,560,00 in 1989 (Poffenberger and Nguyen Huy Phon, 1998).

III.1.2. The Doi Moi

In the early 1980s, the country reached the culmination of a major economic crisis. Agricultural production had followed a gradual stagnation and decrease since the 1970s. By the early 1980s, living conditions and food security had regressed to the standards of the late 1960s (Kerkvliet, 1995). Cooperatives were facing major economic problems. Some of them spontaneously and secretly started to adopt new arrangements with farmers, called "sneaky contracts" (*khóan chui*), contracting some steps of the wet-rice cultivation process (e.g. ploughing, sowing or transplanting) with households. The forestry sector also experienced serious economic problems, including the economic collapse of many SFEs. The latter encountered economic difficulties and exploitation problems – because of a reduction in state support and a shortage of forest resources to exploit (Nguyen Quang Tan, 2006b). Some Party leaders started to question the viability of the socialist system (Poffenberger and Nguyen Huy Phon, 1998). Therefore, before becoming a shift in ideological arguments, the decollectivisation process formed a response to huge economic difficulties. Decollectivisation was indeed initiated in the country long before Vietnam adopted a socialist market-oriented economy in 1986. In 1981, the Party Central Committee promulgated Decree 100 which officially approved contract systems between the state and households for rice production at a national scale. Contracts were signed for 2-5 years for specific steps of the wet-rice cultivation process. It resulted in a rapid increase in paddy yields and the reduction of food insecurity.

In 1986, Vietnam's Party Congress adopted the Doi Moi policy, marking the start of the economic liberalisation and opening of the national economy to foreign investments and international markets. Following years were characterised by the emergence of a variety of forestry and agricultural reforms aiming at improving forest and land management and alleviating rural poverty. The remaining economic crisis[35] and the changes brought by the introduction of contract systems led the government to adopt a new Land Law in 1988. Land was allocated to organisations and individuals for

[35] By 1988, the price of rice had dramatically increased, jumping from 30 VND/kg in 1986 to 300 VND/kg (Woods, 2002).

long-term use. Agricultural products could be sold on the open market, though it was still prohibited to rent, sell or buy land. New rules and regulations were defined to address emerging land conflicts that had multiplied between SFEs and co-operatives on the one hand and upland villagers on the other: in 1991, the Forest Protection and Development Law (called thereafter Forest Law) recognised that individuals and households could be allocated forest resources for management, protection and commercialisation. But, by far, the major policy in transforming upland population's access to resource over the past two decades is the 1993 revised Land Law and its subsequent decrees. The 1993 Land Law has encouraged granting land-use titles (also called red book certificates) to individuals, households and organisations. It has recognised the rights to exchange, transfer, inherit, mortgage and lease land. Allocated land superficies and time periods depend on the family size, intended use and localisation of the land (Table 3-8). The FLA policy was officially promulgated in 1994 with Decree 02/1994/CP. It has allowed the allocation of both forested and non-forested areas (before 1994, only bare lands could be allocated to households) to individuals, households and organisations for long-term periods.

Table 3-8. Conditions of land allocation in Vietnam as specified in Decrees 64/1993/CP and 02/1994/CP

	Use	Maximum amount of land	Time period
Agricultural land	Perennial crops	10 ha	50 years
	Annual crops	2 ha	20 years
Forestry land	Barren land	10 ha	> 50 years
	Forested land	30 ha	50 years

This set of forest policies has aimed, according to the GoV, to shift from State forestry to "social forestry" (meaning forestry let to the people), and from forest exploitation to forest management and protection (Do Dinh Sam and Le Quang Trung, 2001).

III.1.3. Twenty years after the Doi Moi

There is a consensus that, since the start of the period of economic liberalisation, impressive achievements have been made: the poverty rate has been halved between 1993 and 2002 (ADB, 2003) and Vietnam has become one of the three largest rice exporters in the world production (IFPRI, 2003). However, Vietnam still economically lags far behind many of its Asian counterparts, such as Thailand, South Korea, Taiwan or Singapore. In 2004, 8.3 per cent of the population continued to live in poverty (ADB, 2005).

IV. Forest policies

For the past two decades, more than 150 policies related to forest and forestry land management have been issued, among which the major ones are presented in Section III (see Table 3-7). This section introduces forest and land classification and the two sets of policies of interest for this study: the allocation of forestry land to households and communities and the afforestation campaigns. Forest and forestry land are classified into three categories under the 1991 Forest Law according to their intended use:

1) special-use, for nature conservation (e.g. biodiversity preservation) and landscape protection (including historical and cultural heritage);
2) protection, for water resources and soil protection; and
3) production, for commercial activities: exploitation of forest products.

Similarly with regard to land-use categories, the classification of forest and forestry land does not correspond to the actual use/cover but to the intended purpose of the State. The three categories do not preclude distinctions in forest quality or biophysical characteristics. For instance both production and protection forests include natural and plantation forest.

IV.1. Land classification and property regimes

Forest and land classification has important implications for property rights, as presented in Table 3-9.

Table 3-9. Legal recipients of forest and land property rights by forest and forestry land type

Forest/Forestry land type	Owners	Proprietors	Authorised users under contract
Special-use forest/forestry land	MARD, Ministry of Culture and Information, PPCs, MBSFs	MARD, Ministry of Culture and Information, PPCs, MBSFs if area >1,000 ha	District and Commune People's Committees, individuals, households
Protection forest/forestry land	SFEs, MBPFs	MBPFs if area >5,000 ha, SFEs, PPCs, District and Commune People's Committees, individuals, households	Individuals, households, communities
Production forest/forestry land	SFEs	SFEs, PPCs, District and Commune People's Committees, individuals, households, communities, MBSFs, MBPFs	Individuals, households, communities

Source: Do Dinh Sam and Le Quang Trung, 2001, Nguyen Quang Tan, 2006

Legal recipients were classified in Table 3-9 according to the classes of property-rights holders proposed by Schlager and E. Ostrom (1992), as detailed in Table 3-10.

Table 3-10. Rights associated with positions

	Owner	Proprietor	Authorised claimant	Authorised user	Authorised entrant
Access	X	X	X	X	X
Withdrawal	X	X	X	X	
Management	X	X	X		
Exclusion	X	X			
Alienation	X				

Source: Schlager and E. Ostrom (1992)

Special-use forests are under the responsibility of the MARD, the Ministry of Culture and Information (for cultural and historical sites) and PPCs. Their management can be decentralised to a Management Board for Special-use Forest (MBSF) or People's Committees at the district level. If the forest area is under 1,000 ha, management can be decentralised to Communal People's Committees or contracted to households. Protection Forest can be managed by a MBPF. If the forest area is under 5,000 ha its management can be contracted to households, communities and organisations (e.g. mass organisations). Special-use and protection forest contracts are funded by the central government under the 5MHRP. Production forest can be allocated to households, communities, SFEs, private and social organisations (e.g. schools, cooperatives, mass organisations), MBSFs, MBPFs and People's Committees.

The benefits of households in forest management have been reinforced by the benefit-sharing policy formulated in Decisions No 08/2001/QD-TTg and 178/2001/QD-TTg. These are specified in Table 3-11.

Table 3-11. Rights of households by forest/land type

Forest/Land type	Allowed activities	Benefits
Special-use forest	Harvesting, research and ecological tourism	
Protection forest contracted	Collecting fuelwood and NTFPs; Harvesting of all agricultural and forest products when the forest is ready to harvest	State payments of 50,000 VND/ha/year for protection; 20% of NTFPs from timber forests; 30% of NTFPs from bamboo forests
Production forest – Natural forest	Collecting dead trees, trees damaged by fire or other natural calamities, forest products for household consumption; Timber harvesting when allowed	100% of products from poor regeneration forests; 70-80% of products for regenerated forests; 2%/yr of forest with 100 m3/ha/yr of growth; 95% of products for bamboo forests
Production forest – Plantations established by the State	Timber harvesting when allowed	75 to 85% of forest products.
Production forest – Plantations established households	Choice of species, technical norms and harvesting techniques; Collecting fuelwood and NTFPs; Timber harvesting	100% of forest products.

Source: Do Dinh Sam and Le Quang Trung, 2001

The process of land classification has increasingly been decentralised from the central level to provinces. For instance, the central level does not fix specific targets for the area of each forest category, but provides general planning guidelines. The provinces are at present mandated to classify forest and formulate forestry land-use planning, whereas the MARD adjusts and appraises the provincial proposals. Although this leaves provinces with flexibility to classify their forest resources according to prevailing conditions, the absence of defined and enforced general classification criteria means there is no basis for appraising the appropriateness of provincial forest classifications.

IV.2. Afforestation programmes

From the early 1960s to the mid-1980s, the State investments in afforestation focused on scattered tree planting in the delta regions (Sikor, 1998). Since the 1990s, the government afforestation effort has been particularly strengthened and has targeted upland regions, with two major initiatives: the “Greening the Barren Hills Programme” (also called Programme 327 from the name of the Decision 327-CT/1992) launched in 1992 and replaced since 1998 by the 5MHRP. Funding was provided by the GoV for a set of 1,800 projects to be formulated by provincial authorities (Tran Duc Vien *et al.*, 2005). Programme 327 was at its outset a rural development programme with a forestry component. Besides "re-greening" the land, it aimed at increasing agricultural production by using the land: "Provinces with bare land and degraded hills are to establish projects in order to use the land" (Council of Ministers, 1992). The measures aiming at fixing cultivation formed another major component of the programme, reinforced by FLA and sedentarisation programmes. Its focus got increasingly narrowed along its implementation, and was finally restricted in 1995 to forest protection with Decision 556. Programme 327 instituted contracts between the State and households for forest protection.

Its successor, the 5MHRP (also called Programme 661 from the name of the Decision 661-CT/1998), has kept the re-focus of Programme 327 on forestry and forest protection/establishment. It does not include, like the latter at its onset, activities related to other forms of rural development such as industrial crops and husbandry. Although the 5MHRP includes social and economic goals, its primary goal is environmental. The first stated aim in Decision 661 (Prime Minister of the Government of Vietnam, 1998) is: "to increase the forest cover to 43 per cent of the national territory, protect the environment, decrease the severity of natural disasters, increase water availability, ..., protect biodiversity." Objectives are to protect existing forest and to plant 5 million ha of forest (2 million ha of production forest, 1 million ha of industrial and fruit trees, and 2 million ha of protection and special-use forest). The programme is divided into three phases, with the third phase currently running from 2006 to 2010. The 5MHRP is presently one of the most costly national programmes for the government budget (planned state investment for 2006-2010 is approx. 290 million USD). State investment funds allocated to the 5MHRP concern almost exclusively protection and special use forest, i.e. forest that cannot be exploited for economic purposes. The only investment funds that concern production forest are for the establishment of "forest with rare and precious tree species with a production cycle of 30 years or more" (Prime Minister of the Government of Vietnam, 1999). The establishment of production forest is subsidised through a loan scheme, the Development Support Fund. The 5MHRP is more than simply an afforestation campaign. Its implementation relies on forest planning and thus on the still on-going forest classification. Forest planning is based on several economic and development plans, including the master land-use plan, the forest protection and development plans and the provincial socio-economic plans (Nguyen Quang Tan, 2006b). It is also supposed to meet local people's demand and capabilities for forest protection but has rarely involved the participation of the local population. Lastly, it is explicitly linked with FLA, which is presented as a critical condition for the 5MHRP to realise its objectives (Nguyen Quang Tan, 2006b) – the rationale being that long term land-use rights will provide incentives for households to protect and plant forest (Sikor, 2001).

IV.3. Upland allocation

In regard to land use and management, the allocation of uplands officially initiated at the national scale in 1994 has aimed at stopping shifting cultivation, encouraging forest protection and rehabilitation, and supporting the adoption of efficient and sustainable land management systems. FLA has followed a much slower implementation pace than agricultural land allocation (especially in the region of the Central Highlands). According to the FPD, in 2006, households had received property rights for 24 per cent of the area of forestry land (FPD, 2006). Sunderlin and Huynh (2005) estimate that, although 61 per cent of the land has been officially allocated, only 10 per cent has been actually allocated to households and communities. The rest has been allocated to state organisations (e.g. People's Committees or SFEs). In 2005, according to the MARD, 362 SFEs still controlled 40 per cent of forestry land in Vietnam and constituted the largest recipient of forestry land property rights (EASRD, 2005). Most land allocated to households is barren land whereas SFEs have retained the control of land with forest cover (Sikor and Tran Ngoc Thanh, 2007). Many SFEs do not have the capacity to exploit all allocated forest and land and this has led to the encroachment of cultivated land by local populations and conflicts between SFEs and local communities.

Whereas agricultural land allocation is said to have followed an egalitarian process, resulting in relatively low inequity gaps between households[36], FLA has often been criticised because of its capture by the local elite (Sowerwine, 2004). According to the Decree 02/1994/CP, the entrusted land area should be based on the financial ability and the "willingness" of the household to afforest the land (in case of bare land)

36 Inequities in agricultural landholdings and means of production have however widened since allocation (Haroon Akram-Lodhi, 2005).

and to manage it according to state regulations (GoV, 1994). In many areas, only rich and high-sized households have been allowed to claim forestry land. Many conflicts arising from land redistribution were also reported. In principle, to receive forestry land, a household must make a request to the commune authorities who then pass on the request to the District People's Committee that will make the final decision. In practice, FLA has often been implemented with little participation of villagers.

Most farming systems in the uplands have been traditionally based on common management. During the socialist period, when land was under the management and exploitation of SFEs, many communities could still access and use large upland areas since SFEs could neither manage nor control all land. However, when the GoV formally decided to allocate forestry land to the people (Decree No. 02/1994/CP), communities were not included in the list of potential legal recipients. They were only formally recognised as legal forest and land users in 2003 in the revised Land Law[37] and then in 2004 in the revised Forest Law. In practice, allocation to communities has been very limited, often restricted to pilot studies supported by donors and NGOs. According to the FPD, in 2006, 5.9 per cent of forestry land was under common property (FPD, 2006). Land actually legally managed under common property might be less, as official figures usually include land managed by the Commune People's Committees. Nevertheless, large areas of forestry land are still illegally cultivated under customary collective arrangements (Nguyen Quang Tan, 2006b).

The following four chapters discuss the relative impact of these programmes on the range of incentives and constraints that have affected farmers' land-use decisions. The next chapter starts at the local and operational level to explore farmers' decision-making process.

[37] However, contrary to other property rights recipients, communities are still not allowed to transfer, lease, offer or donate their rights (article 117 of the Land Law 2003).

Chapter 4. Stemming from reality: understanding farmers' land-use decisions in three villages of Northern Vietnam

"because villagers have destroyed the mountain too much, now we have to afforest to keep water in the mountain and to reduce soil erosion"

A farmer, in Dong Cao (*Đồng Cao*) village, Tien Xuan (*Tiên Xuan*) Commune, Luong Son District (*Lương Sơn*), Hoa Binh Province, Vietnam, formal interview, 2005

I. Introduction

This chapter depicts the analysis of land-use change in three villages of Northern Vietnam, where farmers have recently replaced cash crop cultivation by tree plantations. From a land-use change point of view, this area is not representative of the NMR. In other northern provinces, cash crops are still prevailing, like in Son La or Thai Nguyen Province (maize cultivation and tea plantations respectively), and local government agencies still find it difficult to convince farmers to plant trees on their allocated land. It is so of the most interest to understand why tree plantations have had some success in this specific area. The present case study indeed offers a valid and meaningful example of afforestation by households in the NMR.

Afforestation was considered in this chapter from a farmer's perspective. This stage constituted an important step in the whole analysis as one major tenet of the study is to link central policies with farmers' decisions. Understanding how the 5MHRP and FLA have affected the range of incentives and constraints that have influenced land-use decisions was an essential pre-requisite for the rest of the study and was the first stage of fieldwork. It provided the basis to build relevant scenarios and models of forest-cover change for the meso-level analysis (**Chapter 5**). It also guided the investigation of the drivers for policy implementation at the provincial level (**Chapter 6**). Lastly, it helped evaluating the relevance and soundness of the discourses on forest and upland management prevailing in the policy-making arena at the central level (**Chapter 7**).

Coupled with a historical perspective and the analysis of actors' perception and dominant narratives, the revised IAD framework provided the basis for analysing linkages between implemented policies and farmers' behaviour. The potential impact of afforestation on livelihoods in these villages was also investigated, based on farmers' perception.

II. Methodology

II.1. Data collection

Reconnaissance fieldwork was carried out in three villages of Hoa Binh Province in the north-west of Vietnam, first following a broad line of enquiry, with a particular interest in upland NRM and rural development issues. One of the selected villages, Dong Cao (*Đồng Cao*), is the location where MSEC research activities[38] have been carried out. The two other villages Dong Dau (*Đồng Dâu*) and Que Vai (*Quê Vải*) are the closest neighbouring villages. They were selected because they are similar in their socioeconomic assets (distance from the main road, livelihood activities, population size, familial ties) but distinct in environmental variables (access or not to a water reservoir, access to smaller or larger upland areas). It allowed interesting comparisons in the study of patterns of livelihood activities and NRM.

The aim of this fieldwork phase was to construct a general picture of the activities of farmers and the use of natural resources, to understand how and why they had evolved over the past 50 years, and to assess which incentives farmers had responded to when making decisions affecting their local environment.

I was supported for my fieldwork by Emmanuel Pannier, a French student, whom I supervised during six months for the field-based final project of his MA in ethnology, Nguyen Duy Phuong, a researcher in environmental sciences of the SFRI, and two interpreters Nguyen Thi Chi and Thu Thi Hien. Emmanuel and I first led the interviews together in Dong Cao and then worked separately respectively in Dong Dau and Que Vai. The methodology adopted in the three villages draws from ethnography and relied on a wide range of tools such as observation of daily life and customs, informal exchanges and in-depth interviews. Rather than focusing our investigation on upland management, we preferred to adopt a holistic approach which could capture the transversality of villagers' practices. It permitted not to make any *a priori* assumptions on the importance of one factor (e.g. political, cultural, economic or institutional) over another (Olivier De Sardan, 1995).

[38] MSEC programme was presented in **Chapter 2**, Section III.1.

During the first week, we behaved as observants, getting to know inhabitants or taking part to farming activities. This stage permitted to make direct observations, to meet villagers informally and create a basis to build trust relationships. We had the chance to participate during this stage in rice summer harvesting, which is the one of most important moments in the rural calendar and in farmers' livelihoods. It conduced to privileged exchanges with many villagers and favoured our insertion in the villages. The second week, we conducted a transect walk throughout the village territory and organised a few participatory exercises (participatory map, wealth ranking) with a group of voluntary villagers.

The next stage consisted of semi-structured interviews with key informant and households (see questionnaire in **Annex B** for the household interviews). In total, 32 key informant interviews at the village, commune and district level and 82 household interviews in the three villages were conducted over a six-week period. Key informants included villagers with a particular social position within the community: the village leader, secretary of the Party cell, head of a mass organisation, or staff working at the Commune People's Committee (list in **Annex C**). Household sampling was made in the following way: all 42 households in Dong Cao were interviewed. Because of time constraints, interviews in Dong Dau and Que Vai were restricted to a sample of 20 households in each village. Households were classified by the village head into three categories, rich, poor and average-income, according to the perceived wealth. Then, six to seven households were selected randomly in each group. In the village of Que Vai, participatory exercises were organised (historical and classification matrixes) with five focus groups: a group of women, of young people and of households sampled in the three wealth categories previously defined. Complementary information on local institutions governing upland management was gathered via semi-structured interviews with a sample of 10 households from Dong Cao and Que Vai during a later stage of fieldwork. Lastly, after fieldwork I kept on visiting frequently some of the village inhabitants with which I had developed friendship relations. I also had the opportunity to go to the villages or the commune to assist other research projects conducted by the IRD/SFRI. Frequent interaction with the villages following the fieldwork offered a dynamic overview of people's practices and behaviours over the whole seasonal cycle and a broad insight of the direction of the evolution of the villages regarding land use and livelihoods within the fast-evolving political and socio-economic context.

II.2. Data analysis

The holon of analysis considered (Figure 4-1) is the action arena at the operational level, where the farmers' decisions directly affect land use. The action arena focuses on the uplands and the farmers' decisions regarding upland management in the case study area. Actors refer in this chapter to every person who has access, use or control over uplands in this area: farmers, local authorities in charge of implementing laws and monitoring land use, and Hanoian investors who have recently purchased some of the surrounding land.

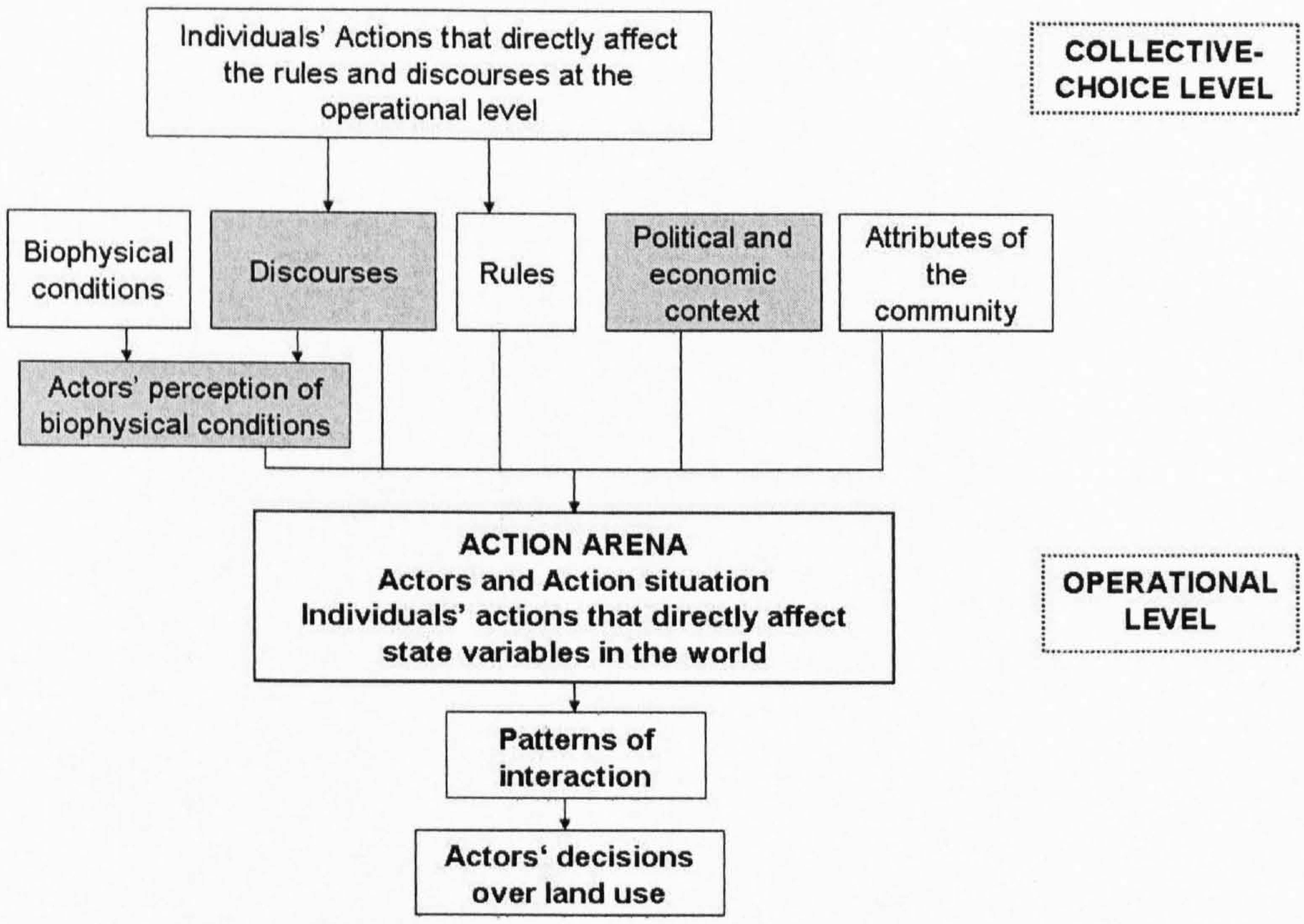


Figure 4-1. The revised IAD framework used at the operational and collective-choice levels

III. Setting up the boundaries: study area and action arena

Tien Xuan *(Tiên Xuan)* Commune is located in Luong Son (*Lương Sơn*) District, Hoa Binh Province, 40 kilometres (km) west from Hanoi (Figure 4-2). It lies in a midland area located at the edge of the Red River Delta (Picture 4-1).

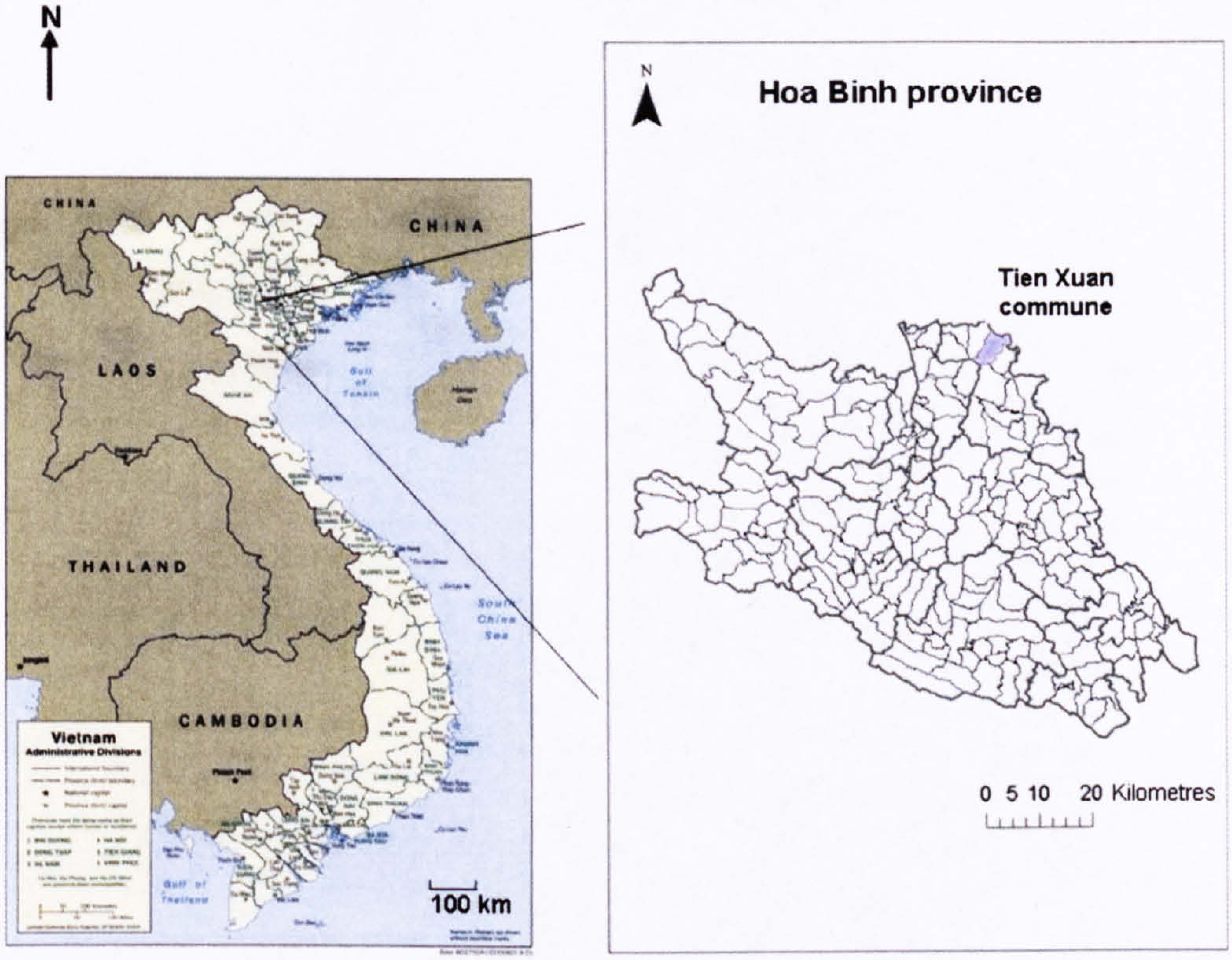


Figure 4-2. Location of Tien Xuan Commune

Picture 4-1. A view of the village of Dong Dau, lowland paddy fields and surrounding hills
Source: Floriane Clement, June 2005

Uplands represent large areas compared to the local population (Table 4-1).

Table 4-1. Some general characteristics of Tien Xuan Commune

Location of Tien Xuan centre	Population in 2004	Yearly average temperature and rainfall	Lowland area	Upland area	Main upland soil types	Slope*	Elevation*
20 58'N 105 29'E	6300 inhabitants	25°C; 1800 mm	320 ha	978.12 ha	Ferralsols and Acrisols	15 to 60%	125 to 700 m above the sea level.

** These figures are measured only from Dong Cao experimental watershed but are representative of the landscape in the whole study area.*
Source: Tran Duc Toan et al., 2001

Rainfall is unevenly distributed: about 85 per cent of the rainfall occurs between May and October (Figure 4-3).

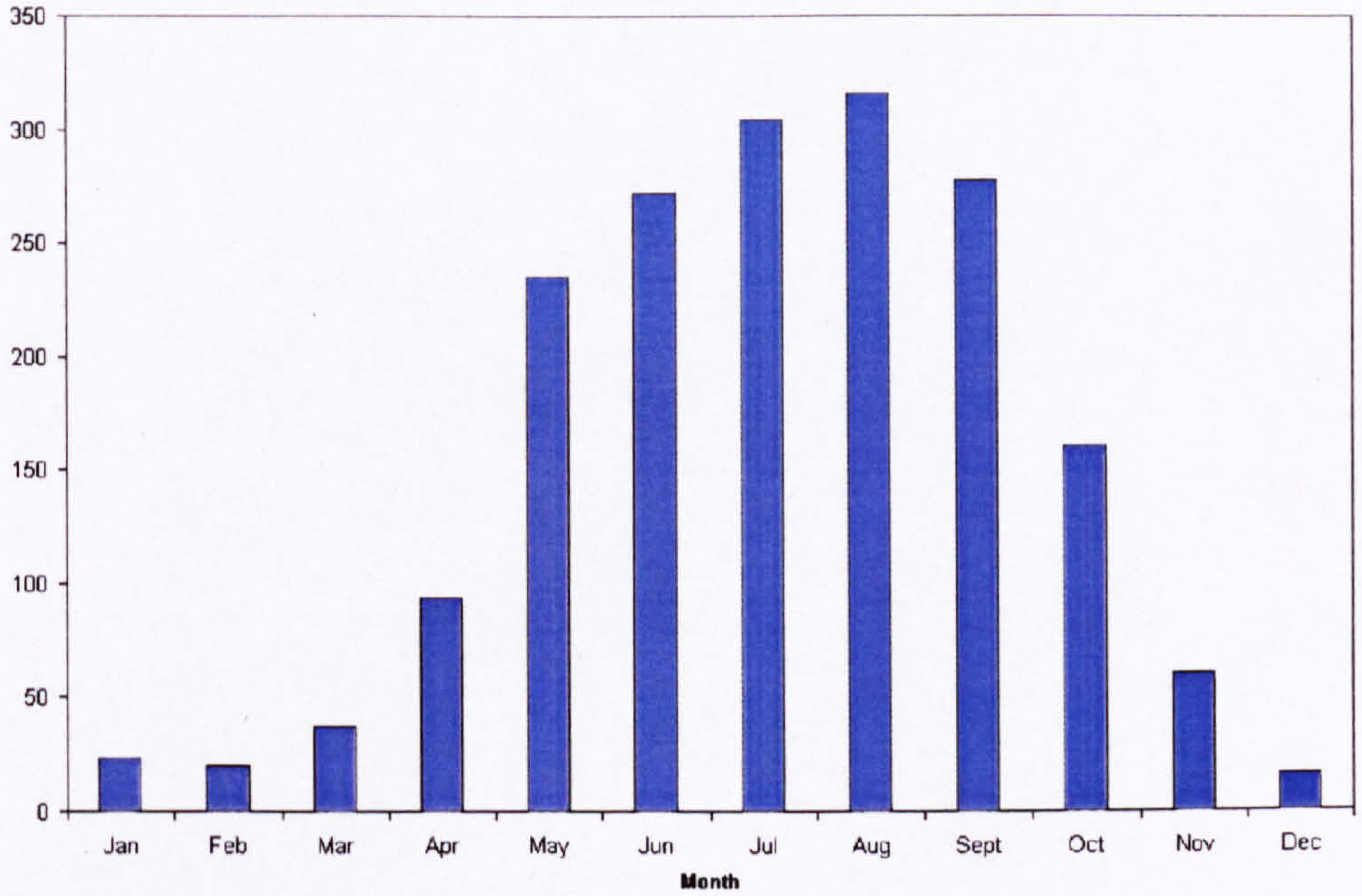


Figure 4-3. Average monthly rainfall (mm) in Hoa Binh Province from 1969 to 2005
Source: Statistics Department, Hoa Binh Province

The dominant upland soil types in this area, Ferralsols and Acrisols, are acid soils, inherently infertile with low resilience, which means it is hard to restore their capability, and moderate sensitivity, which implies that they are quite easily subject to change (Stocking and Murnaghan, 2001).

Dong Cao, Dong Dau and Que Vai were created approximately a century ago by a few Muong families. Local people have traditionally cultivated irrigated rice in the lowlands and have relied on husbandry (pig and buffalo breeding) and aquaculture as a means of living. In the 1960s, under the New Economic Zone government programme, a few Kinh families migrated into the three villages (Table 4-2 presents the current ethnic repartition in the three villages). Regardless of ethnicity, all farmers are presently engaged in a wide range of activities from rice cultivation and husbandry to forestry and aquaculture. Non-farm based employment has also increased over the past few years, especially construction work. Such livelihood diversification strategies have been commonly adopted by rural households to favour income growth and increase resilience to external shocks (Ellis, 1998; Barrett *et al.*, 2001).

Table 4-2. General data on the population of Dong Cao, Dong Dau and Que Vai (2005)

Village	Number of households	Ethnic groups living in the village	Proportion of Kinh households in each village
Dong Cao	42	Muong, Kinh	36%
Dong Dau	64	Muong, Kinh	5%
Que Vai	78	Muong, Kinh	7%

Source: interviews

IV. A story of land-use change

IV.1. Rotational shifting cultivation: Initial structure of the action arena

Uplands in the area were first covered with primary forests, and populated with wild animals. As a response to overcome poverty and famine, local people started to cut trees and sell timber from the 1960s. Progressively, uplands were also opened up for agricultural purposes and, from the mid-1970s, farmers cultivated annual crops: cassava, arrowroot, taro, and maize, practicing rotational shifting cultivation with 10- to 15-year fallow periods (source: interviews) (Picture 4-2).

Picture 4-2. Cassava fields in the hills surrounding Dong Cao in 2000
Source: Tran Duc Toan, 2000

The information and perception farmers had on uplands was essentially based on their own experience. Uplands were seen by villagers as an unlimited resource, but farmers were also aware of their fragility. Many farmers mentioned the inherent low soil fertility of the area and the sensitivity of uplands to degradation: "*when there are heavy rains, water flows with humus*" (a farmer, Dong Cao, formal interview, 2005). They also knew that cassava cultivation was an aggravating factor behind soil erosion: "*when we plant cassava, we have to weed. But when we cultivate on steep slopes, soil runs with water and there are only stones left*" (a farmer, Dong Cao, formal interview, 2005).

Selling prices of cassava, arrowroot, and taro were low[39] and work in the uplands was hard, this being especially pertinent to newly migrated Kinh families who were not used to living in a mountainous environment. However, upland cultivation was the only source of cash income and equally raised the living standards of farmers significantly.

According to farmers, no formal rules governed upland management; work in the uplands was neither managed nor controlled by the cooperative or a SFE. Instead,

[39] Cassava prices, for example, ranged from 300 – 400 VND, i.e., approximately USD 0.02 per kilogram (kg).

farmers had designed their own rules. Everyone was free to clear as much land as wanted; how much land farmers could open only depended on their will and available labour force. Access to uplands was not restricted to any individual or group of people, and was open to farmers from neighbouring villages that had no direct access to uplands. As land was abundant, there was little competition to open new parcels. Farmers used to simply make a mark on the area that they wanted to open up, to signify to other people that they should not start clearing that place.

From the time that farmers first started cultivating the uplands, they were confronted with damage from freely grazing cattle. As cultivated plots were often located far from their dwellings, they either had to build a shelter and stay in the field all day or to create collective rules that could more efficiently cope with this issue. Many farmers decided to create and follow collective arrangements. Cultivated fields were regrouped and fences built collectively to protect the whole cultivated area. The cost of building fences to protect the fields was shared by all the farmers. Farmers could also guard the whole cultivated area when working on their own plot in order to prevent cattle damage. Furthermore, if animals entered the fields, the costs resulting from the damages caused were divided between several plots and thus reduced for each farmer.

Collected data reveal that the period of shifting cultivation was characterised by a land-use system collectively managed with a minimum set of rules-in-use and with no need for external enforcement. Because farmers were aware of the inherent low soil fertility, they adopted rotational shifting cultivation practices that enabled the soil fertility to regenerate. Generally, as long as large upland areas are available, rotational shifting cultivation practices are seen as sustainable and efficient options in terms of economic and environmental costs/benefits in this type of highly sensitive environment (Do Dinh Sam, 1994; Ives *et al.*, 2002, also see Chapter 3, Section I.2).

IV.2. From cessation of annual cropping to afforestation: changes in rules-in-use, external factors and narratives

From the 1990s, forest and land reforms initiated by the government have resulted in dramatic changes in rules-in-use. In Dong Cao, Dong Dau and Que Vai, forestry land was zoned, classified and allocated from 1996 to 1998 according to what had been previously cleared up and cultivated by every family. Land with a slope greater than 25° was classified as forestry land and its use was restricted to forestry. No land has been classified as special-use forestry land in the district of Luong Son. In 1998, FLA was officially completed and land tenure certificates were given to households. In the three villages, most land allocated to famers is production forestry land (in Dong Cao, 18 ha out of 65 ha are classified as protection forestry land). Uphill of the village of Que Vai, around 245 ha of forestry land are classified as protection forestry land. This area has not been allocated yet and is managed by the District People's Committee. Despite the new restrictions on land use imposed by FLA, villagers were not very willing to stop annual cropping, which was their major source of monetary income. The task of the commune authorities for enforcement and control was enormous. A team of twenty persons had to control a 978 ha territory in addition to usual administrative tasks. Even though many villagers were fined, a large majority of farmers kept on cultivating arrowroot, taro, maize, peanuts, and cassava several years after annual crop cultivation was banned.

Most farmers acknowledged that there were few conflicts during the land allocation process. Actually, many of them refused to claim land because they feared that they would be liable to pay more taxes if they were given property rights. Furthermore, the advantages of getting official property rights were not clear, as uplands had previously been freely used and accessed.

In the same period, afforestation programmes were launched in the study area and all over Vietnam. Pertinent schemes included the United Nations World Food Programme[40], which operated in Vietnam from 1975 to 2000 (De Jong *et al.*, 2006a), Programme 327 from 1992 to 1998 and the 5MHRP afterwards. These programmes have provided financial incentives to households to promote afforestation. Depending on the programme, farmers received seedlings, fertiliser, and labour costs (which in turn were deducted from the sales benefits). The WFP even offered rice for each tree planted. The local SFE of Lam Son (*Lam Sơn*), which has managed programme implementation with the local support of the commune authorities, promised to ensure the purchase of timber to the farmers. In this instance, the household has to sign a contract with the SFE and to conform to specific requirements such as cutting time or planting strategy.

[40] This program encompassed six forestry projects and managed to restore some 450,000 ha of production forest.

Lastly, local authorities vaunted forest environmental benefits to justify the implementation of government policies – especially the ban of annual crop cultivation that was quite unpopular – and encourage villagers to follow the afforestation programmes. For instance, villagers were told that the upland allocation programme was implemented by the government for ecological reasons: "*because villagers have destroyed the mountain too much, now we have to afforest to keep water in the mountain and to reduce soil erosion*" (a farmer, Dong Cao, formal interview, 2005).

Progressively from the 1990s to 2003, farmers stopped annual cropping in the whole upland area and the area of planted forest has expanded steadily since 1999 (Figure 4-4). Most of the upland area is currently under fallow or afforested (Picture 4-3).

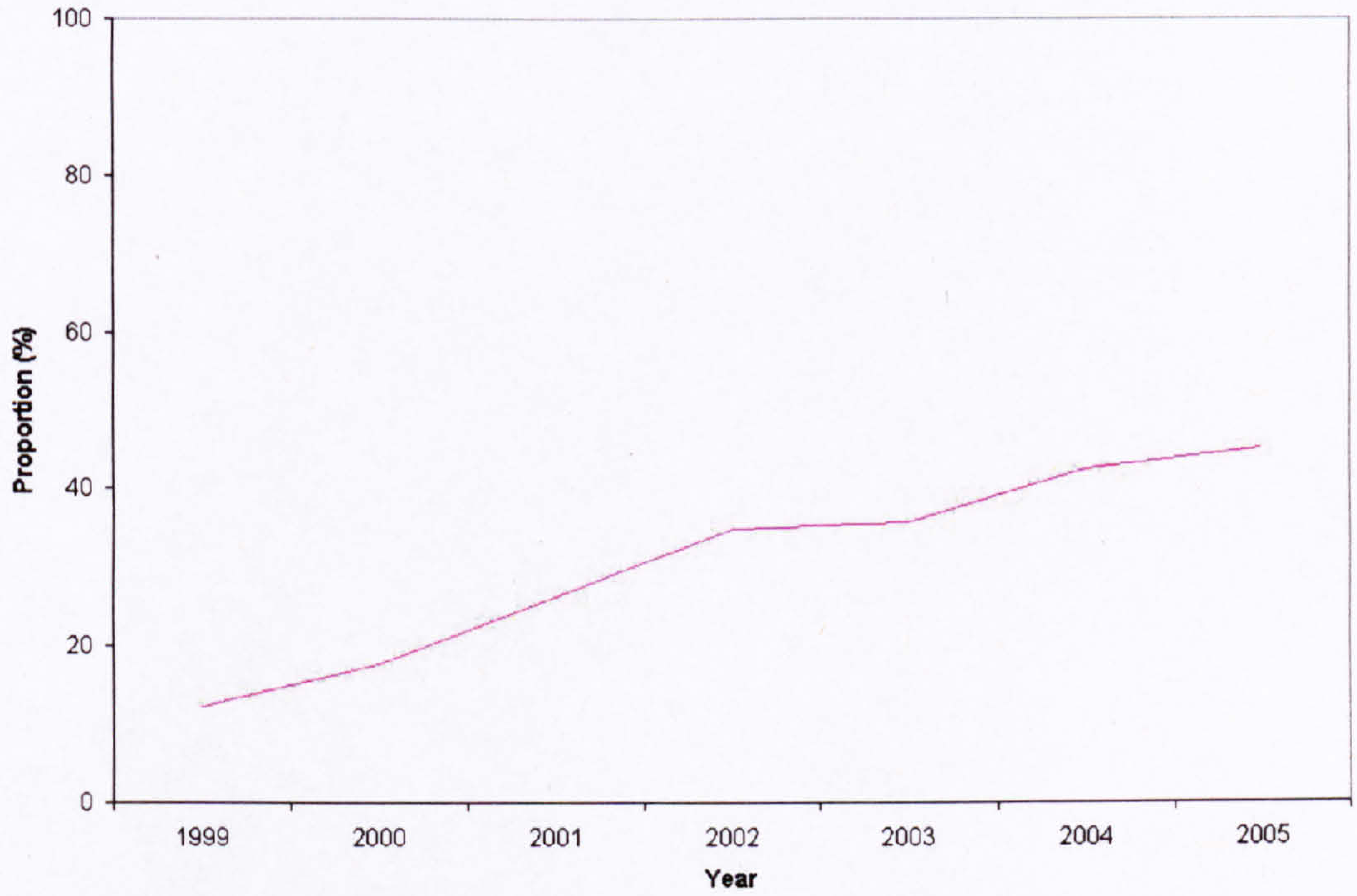


Figure 4-4. Proportion (%) of planted forest area for land classified as forestry land
Source: Forest Protection Unit, Luong Son District, Hoa Binh Province

Picture 4-3. A view representative of current land uses in Dong Cao.
From the middleground to the background of the photograph: irrigated rice fields, maize, cassava, fallow, tree plantations mixed with natural trees
Source: Floriane Clement, June 2005

V. Understanding land-use change from an institutional perspective

As afforestation coincides with the implementation of national land policies, one could presume that FLA and afforestation programmes attained the pursued official objectives: to foster afforestation by households. In a first approach to identify the range of factors that had led to afforestation, farmers were asked about the reasons why they had stopped cultivating annual crops in the uplands (Table 4-3).

Table 4-3. Driving forces leading to the end of annual crop cultivation

Reasons given by farmers	Percentage of respondents
Damage caused by cows and buffaloes to crops	51
Soil was poor	40
It was forbidden (government ban)	22
They sold the land	13
It is what others did	9
Not enough labour force	8
Low cassava selling prices / cultivation not profitable	8
Work was too hard	2
They wanted to plant trees	2

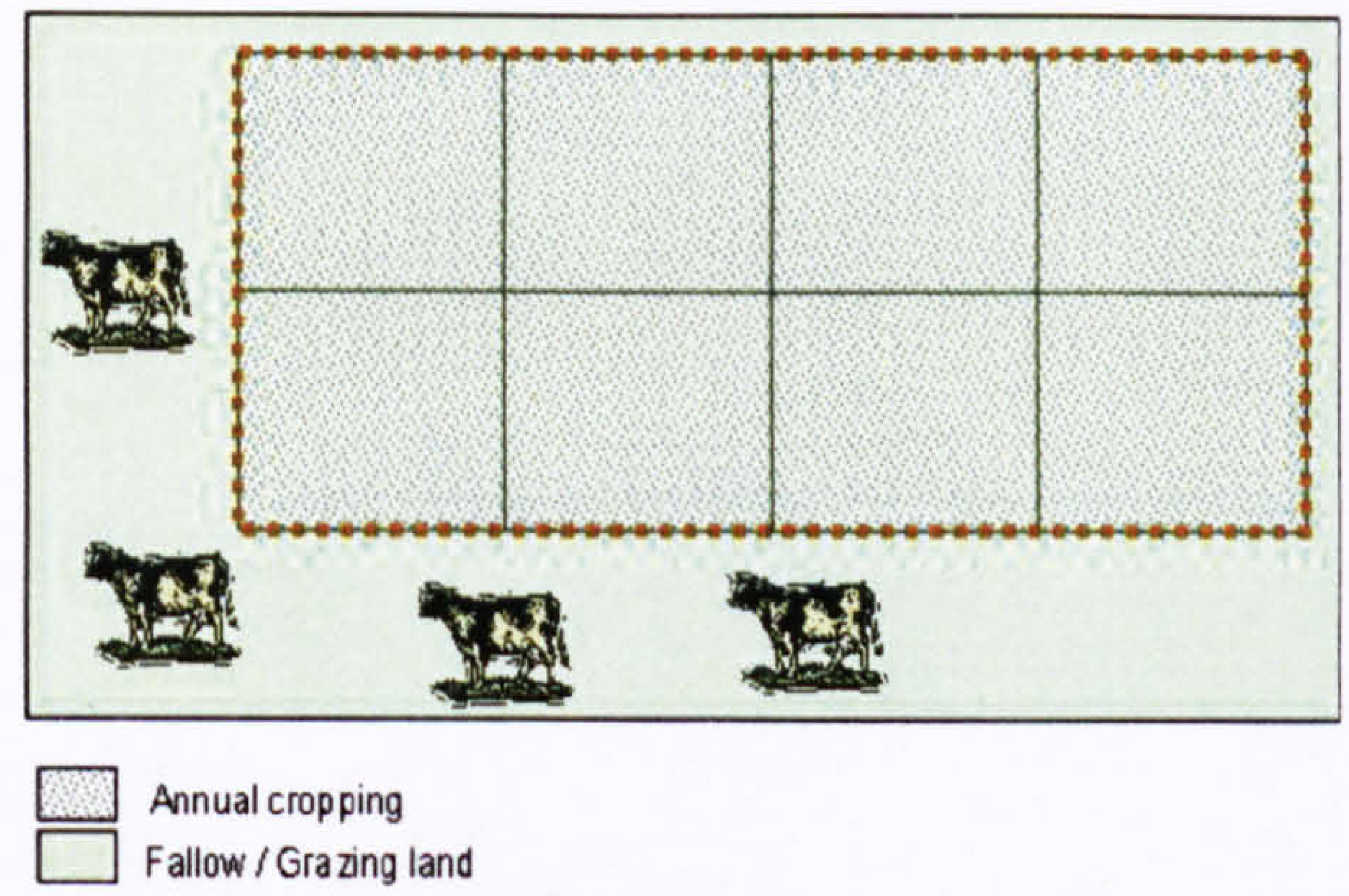
Source: interviews, figures from a 45 household interviews sample

Remarkably, results indicate that very few farmers (2 per cent) stopped cultivating because they preferred to afforest. Poor soil fertility and conflicts between grazing and cultivating activities appear as the main reasons. The data needs however further assessment before being able to draw firm conclusions.

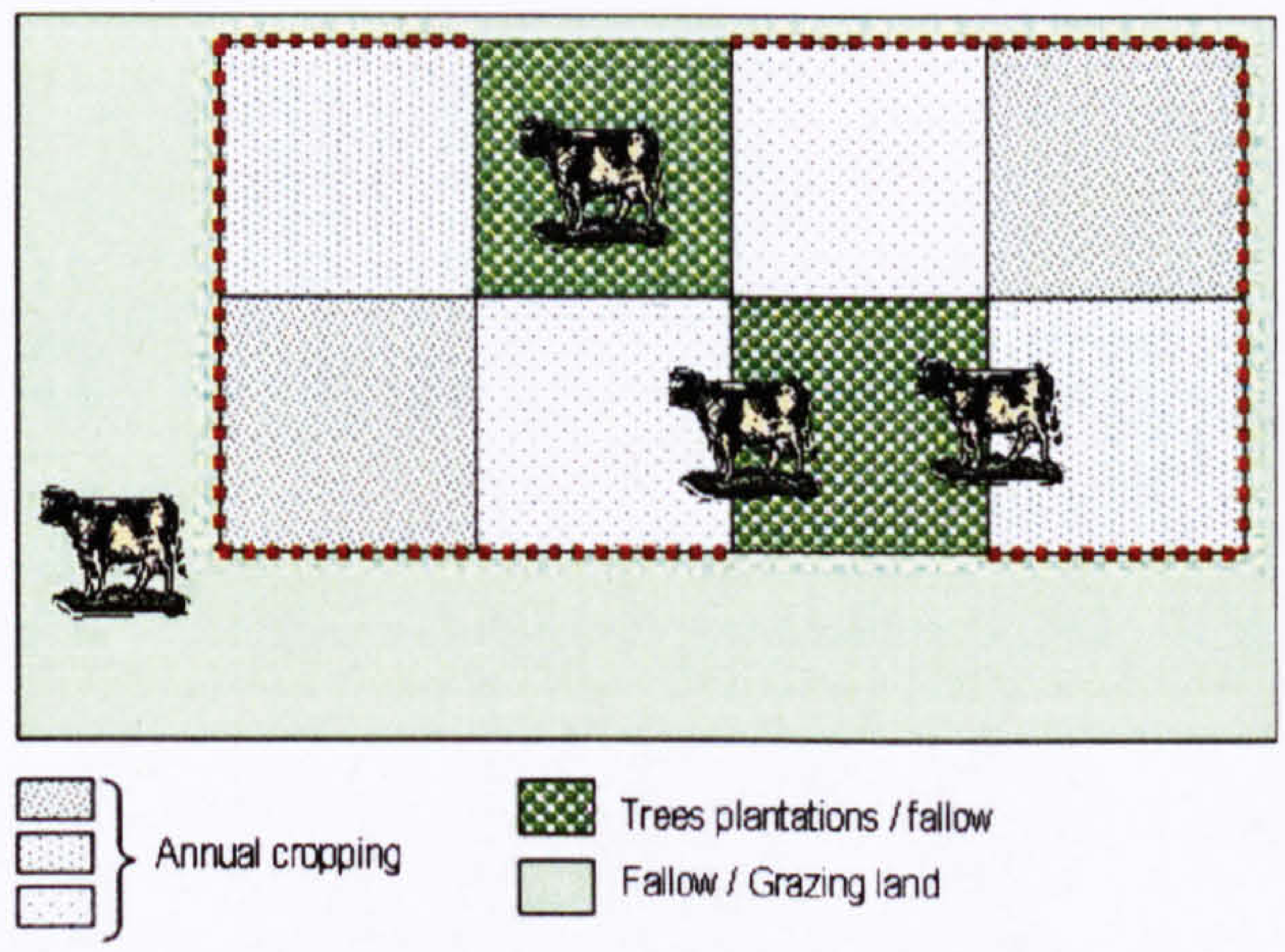
Previous studies of land-use change in the uplands in Vietnam have highlighted the role of agricultural intensification in the lowlands (Sikor, 2001; Ohlsson *et al.*, 2005) and of alternative market opportunities (Ohlsson *et al.*, 2005). According to the interviews held with farmers, agricultural intensification in the three studied villages started in the early 1990s. Since then, rice yields have remained stable. Indeed, the expansion of cash crops cultivation in the uplands occurred together with agricultural intensification. The diversification of livelihoods does not arise as a possible explanation in the present case. The cultivation of annual crops was not replaced by an equivalent income-generating activity, and households, particularly newly installed couples who own a small lowland area for rice cultivation, seek to develop new income-generating activities. Husbandry was developed, but for many poor-average households, buffalo and cow breeding is rather a safety net than a regular source of income. Some households engaged in off-farm work. However, this concerns only a minority of households (20 to 30 per cent in Dong Cao). Hence, the increase of off-farm opportunities was considered as a factor accelerating the collective cessation of cultivation rather than as a decisive factor. New market opportunities for land appeared recently, but land sales started after afforestation. Lastly, as underlined later, tree plantations are not viewed as an attractive option for most farmers. Further research and visits in other northern provinces reinforced the assumption that under the current economic context most farmers prefer cultivating cash crops rather than planting trees (see also Ohlsson *et al.*, 2005).

Then, if not agricultural intensification or new market opportunities, what were the actual reasons that led villagers to stop cultivating? In this context, institutional analysis coupled with a historical approach was particularly powerful in understanding the decisions of farmers. Examining data from a chronological perspective revealed that farmers did not stop cultivating annual crops in the uplands altogether. The end of cultivation ranged from the mid-1990s through to 2003. Data also indicated that the first farmers stopped cultivation for different reasons than the farmers that followed. The first group of farmers did so because they observed – through a decrease in yields, soil hardness, loss of the fertile top-layer of the soil and emergence of stones and rocks – that the soil had become very poor. Some farmers decided to stop cultivating and let the land revert to a natural fallow. In 1995 and 1998, when Programme 327 was promoted and implemented in the area, farmers were encouraged to plant trees because of government subsidies. However, few farmers decided to plant trees at this time. The primary driver for land-use change was thus a decrease in soil fertility and the resulting decrease in productivity. Later on, of more significance was the way informal rules-in-use changed, in turn affecting costs and benefits of annual cropping systems.

The changes caused by these few farmers ceasing cultivation of annual crops affected the informal collective arrangements governing cultivation and grazing cohabitation. It created a domino effect with dramatic consequences on land-use practices of all farmers (Box 4-1). As some fields were no longer protected from free grazing cattle, neighbouring fields were grazed by marauding livestock. Some farmers reported that losses could amount up to 60 per cent of the crop. Costs to protect one's individual parcel of cultivated land increased as land owners had to build fences individually. The costs of annual crops cultivation in the uplands became too high compared to expected benefits from agricultural product sales. Farmers could not move their fields as they could do before because land had been allocated. As a result all farmers progressively ceased cultivating annual crops. Changes in biophysical conditions together with changes in rules-in-use governing land access affected costs and benefits of annual cropping. Behind this rational choice, one can also speculate how much farmers were tempted to imitate others who were considered as the most innovative in the area.



Situation 1.
From the 70s, farmers had adopted collective institutional arrangements to conciliate grazing and cultivation activities in the uplands. They grouped their fields together and built fences collectively to protect them from free grazing cows and buffaloes. Costs to prevent cattle from entering the fields were also reduced through these collective rules as one farmer could watch all neighbors' fields when working on his own field. Lastly, even if animals entered the protected area, damages were shared between the fields and landowners.



Situation 2.
The decision of a few farmers to stop annual cropping impacted the whole collective rules. Farmers who stopped cultivating no longer needed to prevent cows and buffaloes from entering their plot. Neighboring fields were damaged (damaged fields are represented in the adjoining figure with the least dot density). Costs to protect one's field increased as landowners had to build fences individually. Farmers couldn't move their fields as land had been allocated. As a result, all farmers progressively stopped cultivating annual crops, as the costs of protecting one's field were higher than expected benefits from crops sales.

Box 4-1. A schematic representation of the collapse of collective arrangements in the uplands

As mentioned previously, very few farmers (2 per cent of the sampled population) stopped cultivating because they preferred to afforest. The end of cassava, taro, and arrowroot cultivation was a first step in land-use change, and should be distinguished from the next step: afforestation. The reasons why farmers chose to plant trees were distinct from the factors that led to the end of annual cropping. During the interviews, farmers in the three villages were also asked why, once they stopped uplands cultivation, they decided to plant trees. They provided the following reasons: the soil was poor, so nothing else could grow; it provided fuel wood; it was subsidised through a government programme; and they had no other choice. This suggests that afforestation has appeared to farmers as the "least bad solution". This assumption was reinforced during focus group discussions with farmers, presented in the next section.

One can also wonder to which extent narratives on forests spread by the Vietnamese government influenced actors' perception of uplands and farmers' decisions. Farmers were accused in the discourses of local authorities of being responsible for a supposed ecological disaster. They were pointed out as the people who "*destroyed the mountains*" and, following this argumentation, it was logical in the conscience of people that they had to atone for their faults by afforesting the hills. Furthermore, many farmers stated that they planted trees "to afforest" as if afforesting was unquestionably beneficial and constituted a goal *per se*. All farmers strongly believe that runoff from the watershed increases with forest cover. This belief is so entrenched in the minds of people that some farmers use it to explain all land management problems. As an example, when asked why cassava yields had decreased in the uplands, a farmer replied that it was because there was not enough water in the soil because the forest had been cut. But scientific studies indicate that forests tend to reduce soil moisture because of higher transpiration (Calder, 1998; FSIV and IIED, 2002). Soil fertility decline related to soil erosion and/or nutrients plant-uptake are more likely the primary and prominent factor for yield decrease in this area (Tran Duc Toan et al., 2003). It is difficult to assess how much farmers' beliefs in the forest environmental benefits weighed in afforestation, but they were powerful enough so that farmers currently rely more on these than on their own observations.

A synthesis of the factors that led to land-use change is presented in Figure 4-5.

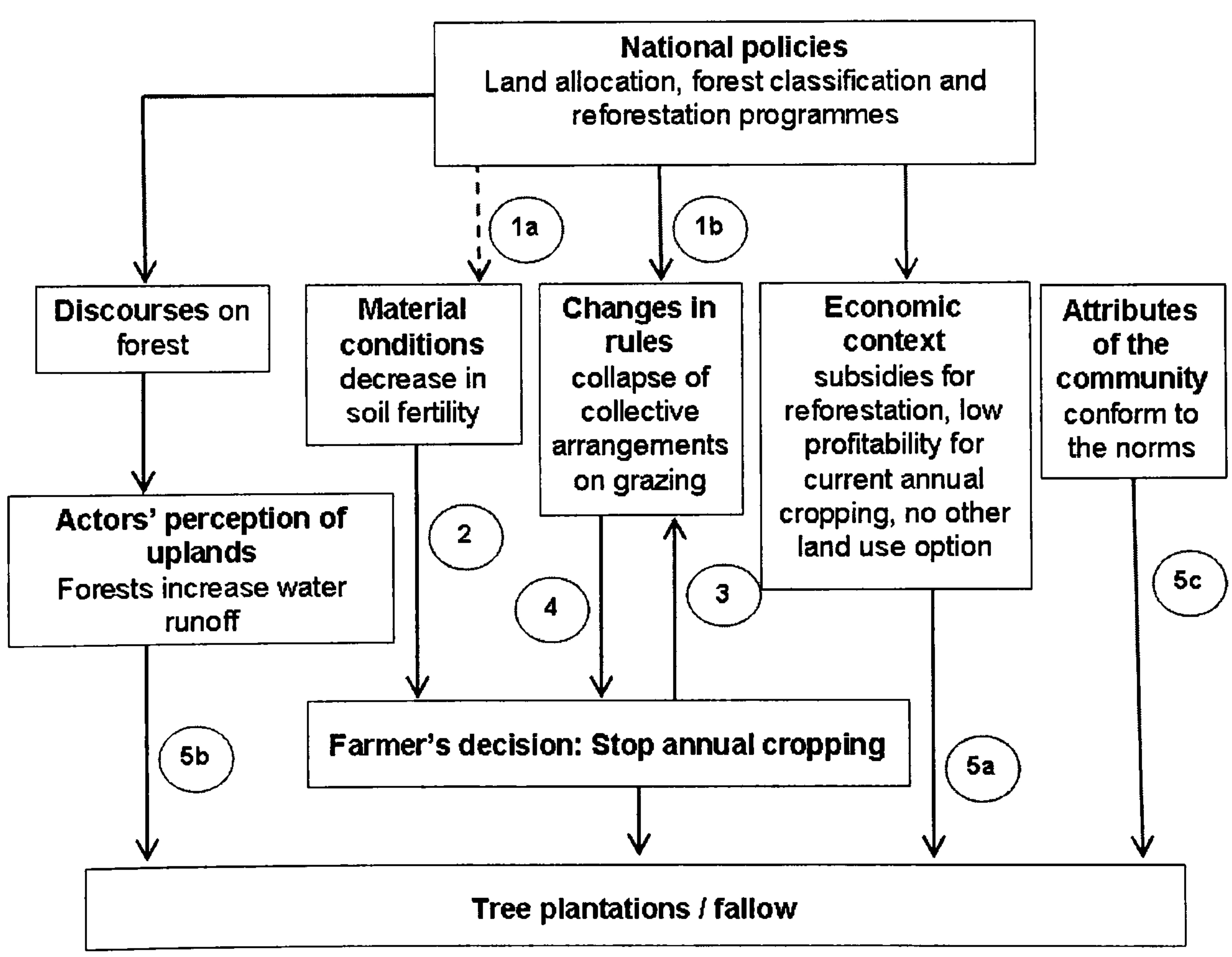


Figure 4-5. Explanation of land-use change in the three villages

The above framework underlines the range of factors involved in the farmer's decision and the resulting land use. Firstly, a decrease in soil fertility which, I suspect, was amplified and accelerated by the shift to fixed cultivation induced by land allocation (arrow 1a in Figure 4-5) led a few farmers to stop annual cropping (arrow 2). Because of land allocation, rules-in-use for land access and use were less flexible (arrow 1b) and farmers could not relocate their parcels next to the farmers who wished to collaborate to protect annual crops from cattle damage. Thus, the decision of a few farmers led to the collapse of the local collective arrangements that governed the cohabitation of cultivation and grazing (arrow 3). This led a large majority of farmers to cease annual cropping (arrow 4). During a second stage, external factors including incentives provided by afforestation programmes (arrow 5a), and to a certain extent new beliefs on forests' benefits (arrow 5b), affected the choice of the alternative land use. Choice of the new land use was reinforced by a certain degree of imitation among farmers who tend to choose options applied by a majority or by the farmers considered to be the most innovative (arrow 5c). Soil fertility decrease and the disruption of local institutions were prominent and decisive factors for land-use change. Economic conditions (rising opportunities for wage labour, low selling prices for annual cropping) also contributed to the final decision but are enhancing rather than decisive factors (i.e. these factors alone would not have led to extended land-use change in the area).

This section has indicated that the relative success of afforestation in the study area was not directly linked with the state policies designed to promote afforestation but rather resulted from the disruption of local land-use systems by these policies. Tree plantations have not been adopted as the preferred option compared with annual cropping but only when there was no other possible option left. One can thus wonder how viable this new land-use option might be.

VI. The impact of afforestation on livelihoods

Many studies (Ngo Thi Minh Hang, 1995; MARD and 5MHRP Partnership Secretariat, 2001; Rerkasem, 2003; World Bank *et al.*, 2004) have challenged the financial attractiveness of smallholders' forest plantations in Vietnam. The main arguments are that farmers lack information on market conditions and connections with merchants. Some authors also recommend a minimum size for allocation to ensure economic viability of tree plantations (Neef and Schwarzmeier, 2001). The sustainability of exotic tree plantations in the case study area under current economic conditions is examined from a farmer's perspective, discussing. the economic efficiency and equity of tree plantations which are currently managed under individual property regimes. In two of the three investigated villages, tree plantations have already been abandoned for other land-use options by many farmers. In Dong Cao, a large majority of villagers have sold their land to Hanoian and to the commune extension worker. In Que Vai, 13 families have started planting sweet bamboo shoots mixed with peanut and cassava cultivation and with chicken breeding under a district-subsidised project.

The following variables tend to demonstrate that this trend will be reinforced in the following years. First, information regarding property rights is quite poor: most farmers who have engaged in an afforestation programme with the local SFE do not know when they will be allowed to cut trees and to whom they will sell the wood. Second, when farmers receive support from the government in the establishment of new plantations they cannot choose which species to plant. They are only provided acacias or eucalyptus saplings. In addition to poor yields, farmers observed that eucalyptus degraded the soil. Scientific studies have indeed observed a change in soil characteristics, e.g., a soil pH decrease, after afforestation with eucalyptus and pine trees (Jackson *et al.*, 2005). Finally, very few farmers are satisfied with the financial benefits provided by silviculture. Although, compared to other areas of the NMR, the economic environment is quite favourable in Luong Son District (due to the proximity with Bai Bang paper mill), farmers complain about income irregularity – with harvesting only occurring every five to seven years. Farmers do not perceive economic efficiency of new land-use systems as satisfactory.

Equity was assessed by exploring perceptions of various groups of actors: women, young people, rich, average, and poor farmers. Table 4-4 presents an extract from the table that was made by women during a focus group exercise. Participants were asked to list all natural resources used by village inhabitants. In the first column, they weighted each natural resource according to its importance for villagers' livelihoods. In the second, third and fourth column, they were asked to weight their relative importance for the following groups: poor, average-income and rich villagers. Importance was ranked on a scale of zero to ten, with zero given to the lowest importance

Table 4-4. Use of natural resources in Que Vai, women's focus group

Natural resources*	Importance ranking (IR)	Poor	Average-income	Rich
Forest wood	0	10	4	3
Wild bamboo shoots	8	9	5	3
Banana tree leaves	3	10	0	0
Water springs	0	0	0	0
Cultivated bamboo shoots	3	5	5	5
Eucalyptus, acacias, styrax	**4**	**0**	**0**	**5**
Grazing land	9	5	5	10
Garden (fruits + vegetables)	7	3	3	10
Rice	10	9	9	10
Corn and sweet potatoes	8	0	0	5
Medicinal plants	3	7	4	4

Source: interviews
Categories presented in the above table were defined by the group of participants during the exercise

Table 4-4 further supports the assumption that exotic tree plantations are considered relatively unimportant for local people's livelihoods. It also suggests that these are only profitable for the richest farmers. These assumptions were reinforced by the results of exercises organised with other focus groups (**Annex D**). The other groups were asked to list sources of incomes for villagers and to rank them according to their importance. The group of young people did not mention tree plantations in the list of activities but "merchant of wood" was considered as an averagely important source of income (ranked the 6th most important out of 10 activities). The group of poor farmers did not mention tree plantations in the list of sources of incomes in the village. The group of average-income farmers ranked it as one of the least important activity in the village. For rich farmers, tree plantations were ranked as a relatively attractive option (6th most important out of 10). The commune extension worker recently decided to plant various tree species with high market values on his land and expects these will bring substantial benefits – although ironically, when interviewed, he justified his choice not on the basis of economic reasons but via ecological arguments. This is not to argue that tree plantations cannot be an attractive option for farmers. But it appears that only few rich farmers have fully benefited from forest plantations. This group of society has access to information and financial capital, is able to make long term investment, and is socially well-connected. These results confirm much of what a liberal economist would anticipate.

VII. Conclusion

Coupling an institutional approach with a historical perspective was particularly efficient for disentangling this complex story of land-use change. First, the historical perspective was necessary to realise how a feedback effect took place between some factors and the action arena. Second, institutional analysis was particularly pertinent in this context, when environmental systems are controlled by a high level of human interaction. The use of the IAD framework highlighted the importance of considering community dynamics. The demise of annual crop cultivation was not only the result of isolated individual behaviour but also the consequence of the collapse of the collective rules-in-use that linked farmers and land-management systems. It was thus crucial to use a framework that could combine household patterns with community trends. From a higher scale of analysis, it was tempting to conclude that afforestation programmes and FLA policies had led to the expected and pursued objectives of afforested area increase in the studied territory. The methodology adopted stressed that considering driving forces at the only macro-level might blanket complex decision-making processes and lead to erroneous conclusions.

Two main lessons regarding the impact of state policies on land use can be drawn from this analysis standing at the farmer level. Firstly, local factors (soil fertility, local rules-in-use governing upland management) have been prominent over government policies in specific outcomes of land-use change. Secondly, state policies have resulted in unexpected impacts. FLA played a major role in land-use change in the study area but not because it provided the right incentives for farmers to afforest. It was rather because it disrupted local institutions and collective land-use systems. Material incentives provided by the GoV to afforest fostered the establishment of tree plantations by farmers in the area but only after annual cropping was no more viable. Afforestation was chosen as a “least bad option”. The analysis of farmers’ perception of tree plantations suggests that under current conditions, tree plantations are not a viable source of income for local people, except for the richest farmers. These results seriously challenge what first appears as a success story of afforestation. More broadly, they question the capacity of forest and land policies in attaining their objectives.

Only a detailed examination of factors at the local level could provide an accurate understanding of land-use change. However, the very same local character of this analysis also constitutes its limitation. It is difficult to draw general conclusions because the present study is restricted to a limited geographical area with specific local determinants. Nevertheless, several local level studies have also emphasised the importance of local factors in forest policy outcomes. Namely, Sowerwine (2004) argued that forest imagined and policed by the State does not match forest reality as experienced and represented by local people. Tran Ngoc Thanh and Sikor (2006) reported the central role of the local distribution of power in how formal rights devolved through FLA are transformed into actual rights and practices.

In the light of these findings new questions arise: what is the relative impact of meso-level factors compared to locally specific factors? Have forest policies led to intended outcomes of afforestation under various local conditions? These questions form the point of departure for the discussion of the next chapter. In the latter, spatial patterns of forest-cover change over the province of Hoa Binh are analysed using environmental and aggregated socioeconomic data at the commune level. Spatial regression analysis coupled with forest-cover maps under GIS assisted in testing several models of deforestation and afforestation and validating various scenarios of forest-cover change.

Chapter 5. Re-assessing the causes of forest-cover change in the NMR on a provincial scale

I. Introduction

The previous chapter underlined the importance of local factors, and particularly of local institutions, in policy outcomes and in farmers' land-use decisions. However, although local factors were identified as important drivers for afforestation, the potential impact of other factors might not have been fully captured in the local level study. The analysis at the village level might have missed out the influence of meso- or macro-level factors, such as the distance to wood processing industries or population density, which variations are observable only on a large spatial scale, e.g. at the district, provincial or regional scale.

In order to investigate this issue, this chapter moves up to the provincial scale. The objectives are firstly to quantify the change in forest cover at the provincial scale and, based on this evaluation, to assess whether meso-level variables have played a significant role in forest-cover change in Hoa Binh Province. However, global statistics hold a major limitation to perform this task: global regression (GR) models only describe an average relationship over a study region between the studied phenomenon and the considered set of independent variables. They thus do not enable the analyst to explore spatially varying relationships between dependent and independent variables. It was a major constraint since it was suspected that the impact of state policies has not been spatially homogenous but, as indicated in **Chapter 4**, highly dependent on local factors such as biophysical conditions and local institutions. Policies and meso-level socio-economic variables might have influenced farmers land-use decisions in various ways depending on locations (Gibson *et al.*, 2000a; Dalle *et al.*, 2006), as it has been the case for most social processes (Fotheringham *et al.*, 1998).

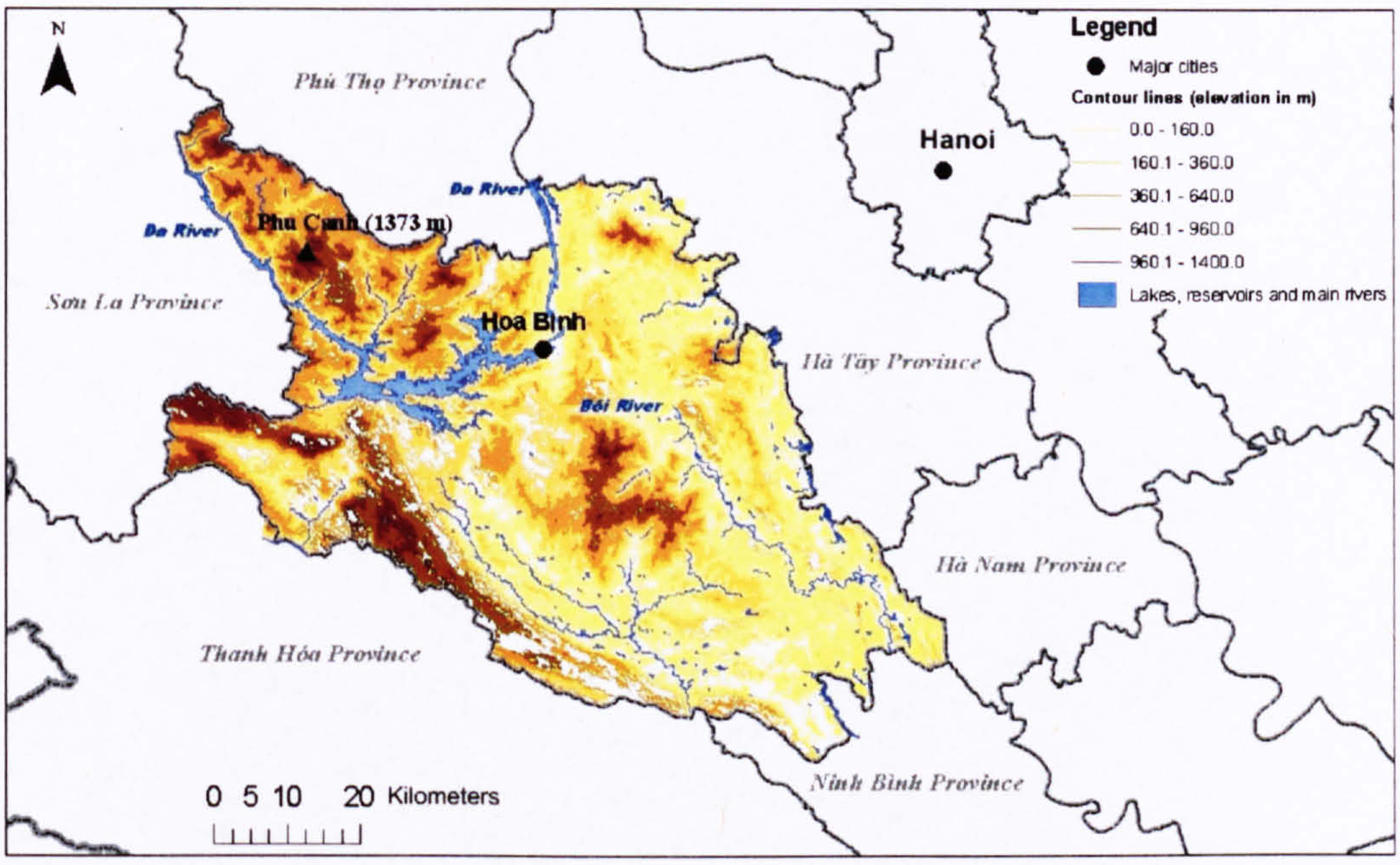
To overcome this problem, Fotheringham *et al.* (1998) propose a technique, known as Geographically Weighted Regression (GWR), to investigate spatial variations in spatial analysis. GWR enables the analyst to take into account spatial heterogeneity by allowing regression coefficients to vary continuously and producing localised outputs for every observation (Fotheringham *et al.*, 1998). It is this technique that was selected to investigate the drivers of forest-cover change at the provincial scale, based on commune-level observations.

The chapter first introduces the study area and the methodology. Forest-cover change was estimated over a seven-year time period by analysing two sets of satellite images from 1993 and 2000. Following this, several GR and GWR models were tested, based on several scenarios of deforestation and afforestation. The performance of the GR and GWR models was compared to select the best goodness-to-fit models for deforestation and afforestation/reforestation processes. Finally, results are discussed, based on the maps displaying the influence of selected independent variables on forest-cover change.

II. Study area

The study area considered in this chapter is the province of Hoa Binh. The province has an area of 4662 km^2 and is located between latitude 20°19' and 20°8' and longitude 104°40' and 104°48' and is bordered by seven provinces (Map 5-1). The highest mountain peaks in the province, Phu Canh (*Phu Canh*) and Phu Yuc (*Phu Yúc*), reach 1373 m. The province is crossed by two major rivers, the Da River, which originates from China and merges with the Red River, and the Boi (*Bôi*) River, originating from Ky Son (*Kỳ Sơn*) District, in the north-west part of the province. Of importance is the 100 km^2 large water reservoir located downstream on the Da River, west of Hoa Binh (*Hòa Bình*) Town, which feeds the Hoa Binh hydro-electric dam. The latter has been running since 1989 and supplies nearly half of the power output in the North. A large area upstream of the dam has been defined and classified as watershed protection forestry land (land use is restricted to forest and the exploitation of forest is limited). In total, 69 per cent of the land is classified as forestry land (FPD Hoa Binh, 2000). Forest-cover estimations are 32 per cent in 1994 (Hoa Binh Statistics Department, 1996) and 44 per cent in 2006 (FPD, 2006). The average monthly temperature ranges from 16.4°C to 29.1°C (2000-2004 figures, Hoa Binh Statistics Department, 2005), with the highest temperatures during the rainy season from June to August and the lowest in January and February. The average number of hours of sunshine per year ranges from approx. 1670 to 1940, and the annual average rainfall varies from 1700 to 2500 mm (2000-2004 figures, Hoa Binh Statistics Department, 2005).

Hoa Binh Province

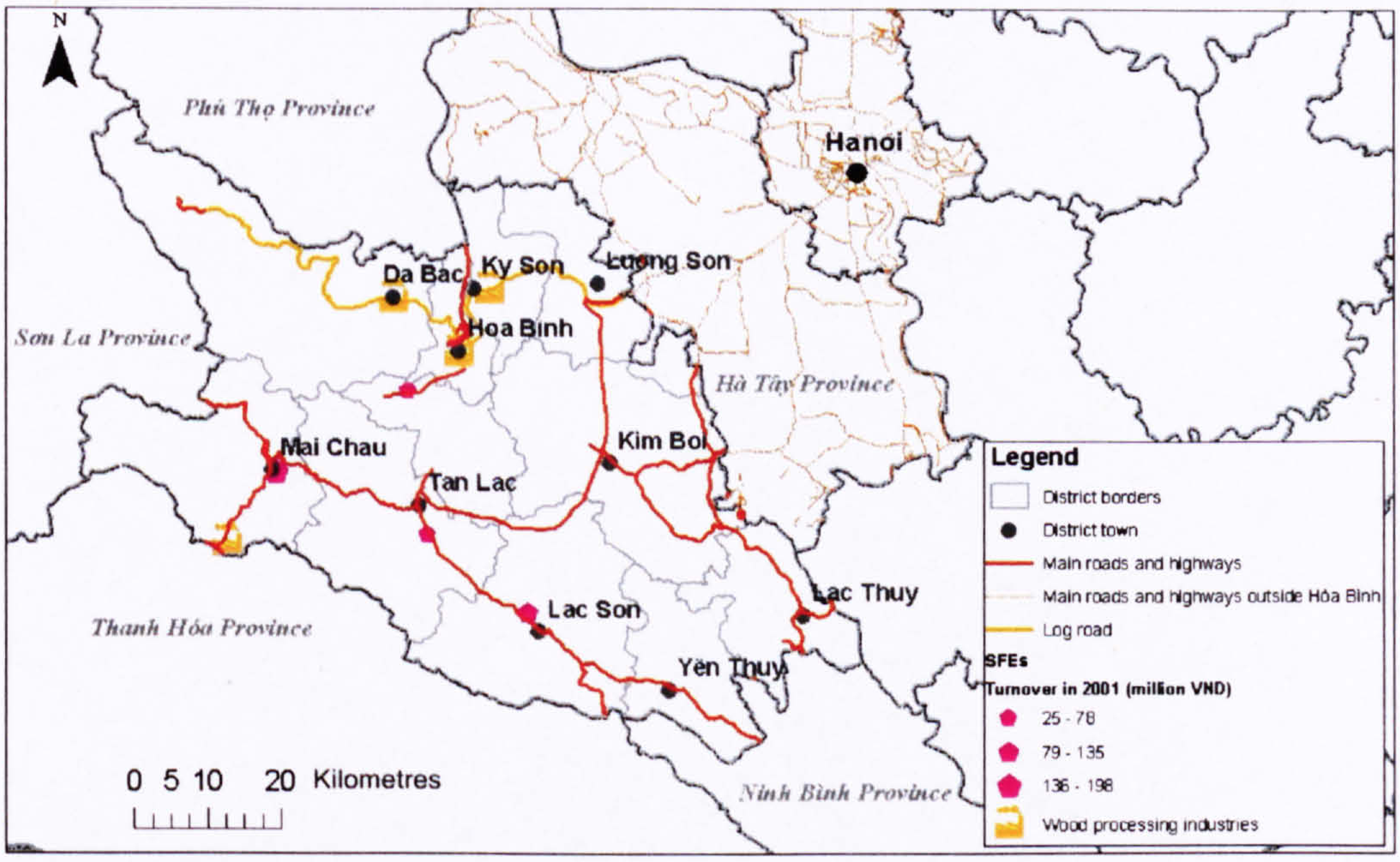


Map 5-1. Geographical map of Hoa Binh Province showing rivers and topography

Hoa Binh Province comprises 10 districts and towns and 214 communes (Map 5-2). Its capital Hoa Binh is located 72 km west from Hanoi. The province territory is the home to 30 ethnic groups. The Muong form the largest ethnic group in the province, with 63.3 per cent[41] of the province population in 1999. The highest concentration of Muong can be found in the districts of Lac Son (*Lạc Sơn*), Kim Boi (*Kim Bôi*) and Tan Lac (*Tân Lạc*). The Kinh (27.7 per cent) have mainly settled in Hoa Binh town and in the district of Lac Thuy (*Lạc Thuỷ*). The Thai (3.9 per cent) are mostly concentrated in Mai Chau (*Mai Châu*) District and the Tay (2.7 per cent) reside mainly in Da Bac (*Đà Bắc*) and Kim Boi Districts. The other larger groups are the Dao (1.7 per cent) and Mong (0.5 per cent). The remaining groups form around 1.2 per cent of the population.

[41] All figures on the proportions of ethnic minority groups in Hoa Binh Province are from the last Population and Housing Census, 1999. They are available on the website of the Committee of the Ethnic Minority Affairs on http://www.cema.gov.vn/modules.php?name=Content&op=details&mid=7795 (page only available in Vietnamese)

Hòa Bình Province



Map 5-2. Administrative map of Hoa Binh Province showing districts borders and towns, roads, SFEs and wood processing industries

According to a report of the DARD of Hoa Binh, the process of FLA ended in 1997 (DARD Hoa Binh, 1997). As shown in Table 5-1, in 1999, property rights had been devolved to households for only 35.5 per cent of the forestry land, the rest being still under the control of state bodies (FPD Hoa Binh, 2000).

Table 5-1. Area of forestry land allocated by category of property rights recipient

Districts	Total forestry land area (km^2)	Forestry land allocated to households		Forestry land allocated to communes		Forestry land contracted to households		Forestry land not allocated yet		Forestry land managed by SFEs	
		Area (km^2)	%	Area (km^2)	%	Area (km^2)	%	Area (km^2)	%	Area (km^2)	%
Hoa Binh	80.2	55.1	*68.7*	6.3	*7.9*	18.8	*23.5*	0.0	*0.0*	0.0	*0.0*
Da Bac	662.8	284.7	*42.9*	0.0	*0.0*	233.5	*35.2*	144.7	*21.8*	46.1	*7.0*
Mai Chau	330.7	49.0	*14.8*	44.2	*13.4*	168.2	*50.9*	69.3	*21.0*	39.4	*11.9*
Ky Son	301.2	120.0	*39.9*	50.6	*16.8*	64.1	*21.3*	66.	*22.1*	57.6	*19.1*
Luong Son	227.9	94.2	*41.3*	61.4	*27.0*	28.6	*12.6*	43.6	*19.1*	25.8	*11.3*
Kim Boi	499.0	183.7	*36.8*	0.0	*0.0*	180.1	*36.1*	135.2	*27.1*	17.0	*3.4*
Tan Lac	365.7	126.3	*34.5*	37.4	*10.2*	168.4	*46.0*	33.6	*9.2*	22.0	*6.0*
Lac Son	383.3	119.0	*31.0*	19.8	*5.2*	191.4	*49.9*	53.1	*13.9*	28.1	*7.3*
Lac Thuy	195.5	47.3	*24.2*	0.0	*0.0*	95.2	*48.7*	53.1	*27.1*	18.2	*9.3*
Yen Thuy (*Yên Thuỷ*)	176.9	63.7	*36.0*	0.0	*0.0*	68.5	*38.7*	44.7	*25.3*	0.0	*0.0*
TOTAL	**3223.4**	**1143.0**	***35.5***	**219.7**	***6.8***	**1216.9**	***37.8***	**643.8**	***20.0***	**254.3**	***7.9***

Source: FPD of Hoa Binh, 2000

Afforestation programmes implemented in the province include the United Nations World Food Programme in the early 1990s, Programme 327 from 1992, replaced in 1999 by the 5MHRP. Total money spent by these projects and by SFEs in Hoa Binh Province between 1999 and 2004 for forest protection and care (25.0 per cent), zoning (1.4 per cent) and plantation (73.6 per cent) is equivalent to 176.27 billion VND (*c.* USD 11 million) (DARD, 2005).

III. Assessment of forest-cover change

In order to estimate change in forest cover, land-use maps were collected in Vietnam. Maps were available for the years 1985, 1993 and 1999 from respectively the DONRE of Hoa Binh and the Vietnamese Environmental Protection Agency. Figures of forest cover were calculated from the latter using ArcMap a component of the ESRI's ArcGIS suite of GIS software. They were then compared with figures aggregated at the provincial level collected from other sources to assess their accuracy (Table 5-2). Because the figures derived from the land-use maps were found to differ greatly from the statistical data, remote sensed data were used to get a reliable estimation of change in forest cover. Table 5-2 compares the figures of forest cover collected from various sources and the figures estimated in this study using satellite images.

Table 5-2. Figures of forested area (km^2) in Hoa Binh Province from 1990 to 2004 from several sources

	1*	2*	3*	4*	5*	6	7*
1990	1476.4						
1993						1139.3	1425.4
1994	1886.8†						
1997	1581.2		1476.4				
1998	1675.8	1578.4					
1999	1673.3				2116.0		
2000	1656.8			1943.1			1443.3 – 1499.0‡
2001	1666.2						
2002	1747.7						
2003	1833.5						
2004	1961.1						

* *Sources of data collection:*
1. Statistics Department of Hoa Binh; 2. FPD of Hoa Binh; 3. DARD of Hoa Binh; 4. GDLA of Hoa Binh; 5. Derived from the land-use maps of the DONRE of Hoa Binh; 6. Vietnamese Environmental Protection Agency; 7. Calculated from Landsat Thematic Mapper (TM) and Enhanced Thematic Mapper Plus (ETM+) image analysis
† *I assumed that it was a typographic error and that the actual figure was 1486.88 km^2*
‡ *An interval is given here because of the indetermination of land cover in an area masked by a cloud.*

Two satellite scenes were necessary to cover the province area. Four Landsat images were acquired, with two scenes each for the years 1993 (Landsat TM) and 2000 (Landsat ETM+). The two adjacent scenes for each year were taken on the same day. All satellite images were acquired during the winter season, at the end of December (1993) and at the beginning of November (2000). Winter season is the harvest season and is thus well-suited to separating forest and non-forest areas, but not to distinguishing deciduous and evergreen forest[42] (Giri *et al.*, 2003). Rice is usually harvested in early October in Hoa Binh Province, but cassava and maize are harvested in December. The presence of upland mature crops might have affected the classification process of the 2000 scenes due to spectral overlap between the young forest and upland crops classes. These two classes might have similar spectral signatures, which makes them difficult to separate during the classification process.

[42] Separation is done thanks to the spectral characteristics of the leaves (reflectance in red and infrared is higher for broadleaf forest than coniferous forest).

Because of the differences of upland cover classes between the 1993 and 2000 scenes, training sites were collected for both images and distinct spectral signatures were used. The pre- and post-processing operations, image classification and accuracy assessment were performed with the software ERDAS Imagine.

III.1. Pre-processing

First, the analyst would like the amount of light measured by the satellite sensor to be equal to the proportion of light reflected by the Earth surfaces, known as the at-surface reflectance, a property that is theoretically independent of the measurement conditions. The latter will guide the classification process (bodies of different natures will be separated by their reflection properties). There are three steps to derive at-surface reflectance values from satellite measurements.

(1) The analyst needs to convert the digital number (DN) values recorded at the sensor to the at-satellite radiance. For each band, the response of the sensor to the amount of incoming energy is characterised by a linear relationship:

$$L_\lambda = \frac{(L_{\max} - L_{\min})}{255} * DN + L_{\min} \qquad 5\text{-}1$$

Where:

L_λ is the radiance expressed in $Wm^{-2}cm^{-2}sr^{-1}\mu m^{-1}$ (sr is the symbol for steradian, which is the standard international unit of the solid angular measure)

$L_{\min}$ is the lowest radiance measurable by the sensor

$L_{\max}$ is the highest radiance measured by the sensor

(2) The analyst needs to calculate the reflectance from the radiance value. For LandSat imagery, the reflectance and radiance are linked by the following relationship:

$$\rho_p = \frac{\pi * L_\lambda * d^2}{ESUN_\lambda * \cos\theta_s} \qquad 5\text{-}2$$

Where:

ρ_p is the planetary reflectance (unitless);

L_λ is the radiance expressed in $Wm^{-2}cm^{-2}sr^{-1}\mu m^{-1}$;

d is the Earth-Sun distance in astronomical units AU;

$ESUN_\lambda$ is the mean solar exoatmospheric irradiance in $mWcm^{-2}\mu m^{-1}$; and

θ_s is the solar zenith angle in degrees.

(3) It is necessary to apply corrections to account for the influence of the atmosphere (i.e. scattering and absorption of light) upon transmitted radiance. Atmospheric correction was performed on the four satellite images, using the dark object subtraction (DOS) method proposed by Chavez (1996). The DOS method is a simple and widely used method with a relatively low accuracy. It is in this case the only appropriate technique since suitable contemporaneous meteorological or ground reflectance measurements were not available for the image dataset. In the DOS method, the radiance scattered by particles present in the atmosphere is subtracted from the whole image, based on the assumption that any radiance measured by a sensor from areas of shadow (or deep water bodies) has been scattered by atmospheric particles. In addition to this undesirable additive component, the multiplicative component of atmospheric absorption is crudely accounted for by dividing the radiance value by the cosine of the solar zenith angle (indicating atmospheric path length). The minimum DN is subtracted to the apparent at-satellite radiance for each band according to the following:

$$L_T = \frac{(L_\lambda - L_{HAZE})}{\cos\theta_s} \qquad \textbf{5-3}$$

Where:

L_T is the surface radiance;

L_λ is the at-satellite radiance;

L_{HAZE} is the path radiance (i.e. the minimum DN value of the pixels); and

θ_s is the solar zenith angle in degrees.

The atmospheric correction was performed using the model-maker function of ERDAS Imagine. Following this, the two adjacent scenes of each year were mosaiced into a large image. The 1993 image was geo-rectified using 30 ground control points of the GIS layer of the road network system. The aim was to co-register the satellite images with the GIS components used for the spatial regression analysis. Thus the absolute geometric accuracy of the road network was not essential. The 2000 image was geo-rectified using 15 ground control points from the geo-referenced 1993 image. Then each image was subset to the province administrative territory (**Annex E**). Thermal and shortwave bands (bands 61, 62 and 7) were removed from the images prior to classification as these bands did not provide any useful information for land cover determination in this instance.

III.2. Classification

Land-cover maps were generated by applying a supervised maximum likelihood classification to these geo-rectified images. For the 1993 image, seven categories were defined: forest, forest under shadow, upland shrubs and scrubs, upland barren, upland grass, lowland fields and water bodies and for the 2000 image, eight categories: forest, forest under shadow, upland bare land, upland crops, shrubs and grass, lowland fields, deep and shallow water bodies and cloud cover. Because of their questionable reliability, land-use maps acquired from the State Departments were not used to support the classification process. Image classification was guided by the analyst knowledge of land use in the area and by the Normalised Difference Vegetation Index (NDVI) produced for the scene. In addition, the topographic GIS layer of the province helped distinguishing lowland and upland areas. The NDVI is a normalised ratio of the near infra-red and red bands.

$$NDVI = \frac{NIR - R}{NIR + R} \quad \textbf{5-4}$$

Where:

R is the radiation reflected in the red band; and

NIR the radiation reflected in the infrared band.

The NIR/R ratio can provide a rough measure of photosynthetic activity and biomass for each pixel (Chen and Brutsaert, 1998; Boone *et al.*, 2000). Its application to characterise the biomass of tropical forests is limited (Foody *et al.*, 2001) since it saturates at high vegetation amounts. Hence it was used as a qualitative tool to guide the analyst in distinguishing upland crops, bare land, shrubs and grasses, and forest.

After the classification, a smoothing 3*3 majority filter was applied to the classified image (**Annex E**) to reduce the salt-and-pepper appearance of the classified image. The majority filter changes the pixel classification to the majority class of the neighbouring pixels (if there is no majority, the pixel class remains unchanged).

III.3. Accuracy assessment

An accuracy assessment was performed post-filtering using as a substitute ground validation dataset: (1) the 1993 land-use map from the Vietnamese Environment Protection Agency for the 1993 image, and (2) two aerial photos of 1999 from the Department of Survey and Mapping of Vietnam for the 2000 image. No contemporaneous field data was available for 1993 or 2000. Aerial photos were co-registered with the GIS road networks used to geo-reference the satellite images, re-sampled using cubic convolution to preserve optima visual appearance. The accuracy assessment focused on the forest class (more pixels were referenced for this class) since only forest-cover figures were used for further analysis. The training sites (pixels of known identity used to perform the accuracy assessment) were chosen randomly within areas in the photographs which were thought not to have undergone change between 1999 and 2000, i.e. outside of border areas of land use classes. The derivation of observations from aerial photographs into substitute "ground validation" data might lead to errors in the accuracy assessment. Nevertheless, the degree of confidence in differentiating forested from non-forested areas is relatively high as the texture, tone and shape of forested areas are easily distinguished from other land uses such as agricultural fields or grass. Accuracy results are shown in Tables 5-3 for 1993 and 5-4 for 2000. The overall classification accuracy is of 88.56 per cent for the 1993 image and 82.95 per cent for the 2000 image.

Table 5-3. Accuracy assessment results for the classification of the Landsat TM 1993 realised from the 1993 land-use map (source: Vietnamese Environment Protection Agency).

Class Name	Referenced*	Classified*	Correct*	Producer's accuracy* (%)	User's accuracy* (%)
Upland grass	26	27	25	96.15	92.59
Upland denuded	22	15	11	50.00	73.33
Upland scrubs and shrubs	13	17	10	76.92	58.82
Forest†	96	94	94	98.00	100.00
Lowland fields	51	54	45	88.24	83.33
Water bodies	28	29	24	85.71	82.76

Source: This study

* *"Referenced" refers to the number of pixels referenced by the analyst for this class. "Classified" refers to the number of pixels referenced by the analyst and classified by the software as pertaining to this class. "Correct" refers to the number of pixels referenced by the analyst as pertaining to this class which were classified by the software as pertaining to this class. The producer's accuracy gives the percentage of correct pixels referenced - it measures the error of omission. The user's accuracy gives the percentage of correct pixels classified – it measures the error of commission.*

† *The classes "forest" and "forest under shadow" were merged for the accuracy assessment.*

Table 5-4. Accuracy assessment results for the classification of the Landsat ETM+ 2000 realised from a land-use map 1999 (source: DONRE of Hoa Binh) and two aerial photos, 1999 (source: Department of Survey and Mapping of Vietnam)

Class Name	Referenced	Classified	Correct	Producer's accuracy (%)	User's accuracy (%)
Upland crops, shrubs and grass	64	77	59	92.19	76.62
Upland denuded	48	53	34	70.83	64.15
Forest†	122	120	119	97.54	99.17
Water bodies†	36	30	29	80.56	96.67
Lowland fields	62	44	42	70.97	67.74
Lowland other	13	20	4	30.77	20.00

Source: this study
† *The classes "forest" and "forest under shadow" / "shallow water bodies" and "deep water bodies" were merged for the accuracy assessment.*

Results indicate that 98 per cent (1993) and 97 per cent (2000) of the pixels for forest were correctly classified (cf. producer's accuracy in Tables 5-3 and 5-4). No pixels (1993) and less than 1 per cent (2000) of the pixels from another class were classified as forest (cf. user's accuracy in Tables 5-3 and 5-4). The accuracy assessment report also provides the Kappa coefficient for each land class. It expresses the proportionate reduction in error generated by a classification process compared with the error of a completely random classification. The overall Kappa Statistics is 0.86 for the 1993 image and 0.73 for the 2000 image. The Kappa coefficient for forest is 1.00 in the 1993 and 2000 image (Tables 5-5 and 5-6), which implies that according to the accuracy assessment performed, the classification process avoided 100 per cent of the errors that a completely random classification would generate (Congalton, 1991).

Table 5-5. Kappa coefficients. Assessment of land classification for the image 1993

Land cover class	Kappa coefficient
Upland grass	0.92
Upland denuded	0.71
Upland scrubs and shrubs	0.56
Forest	1.00
Lowland fields	0.79
Water bodies	0.80

Source: this study

Table 5-6. Kappa coefficients. Assessment of land classification for the image 2000

Land cover class	Kappa coefficient
Upland crops, shrubs and grass	0.69
Upland denuded	0.55
Forest†	1.00
Water bodies†	0.98
Lowland fields	0.76
Lowland other	0.31

Source: this study

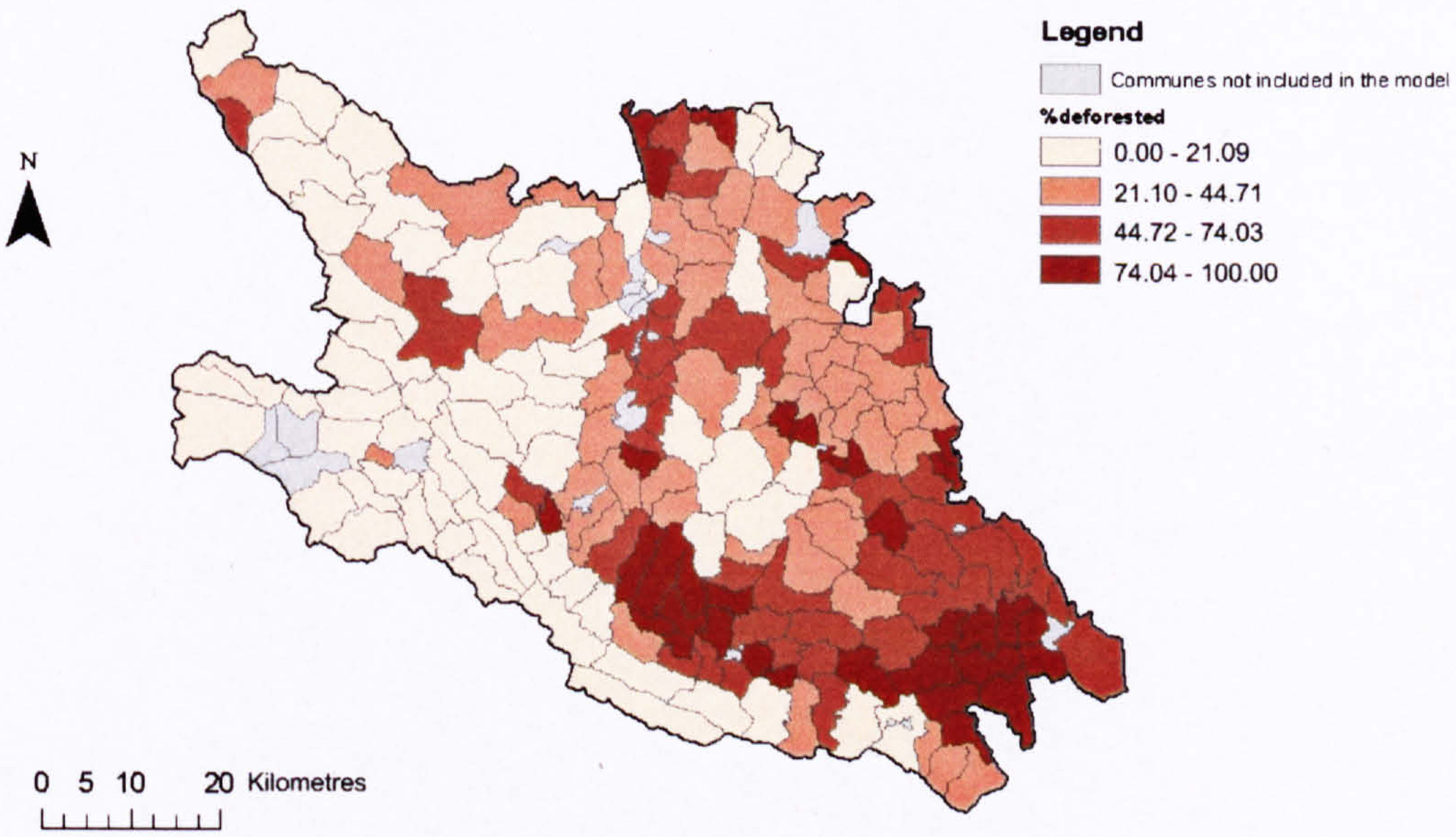
Despite the high accuracy of the classification process itself, forest-cover estimations based on satellite image interpretation are known to be subject to uncertainties related to tree phenology, topography and atmospheric corrections (Song and Woodcock, 2003). Furthermore, the reliability of the accuracy assessment was limited in two respects: the selection of the test sites was not completely random and it was not based on contemporaneous ground validation data. Results should thus be treated with caution.

III.4. Results

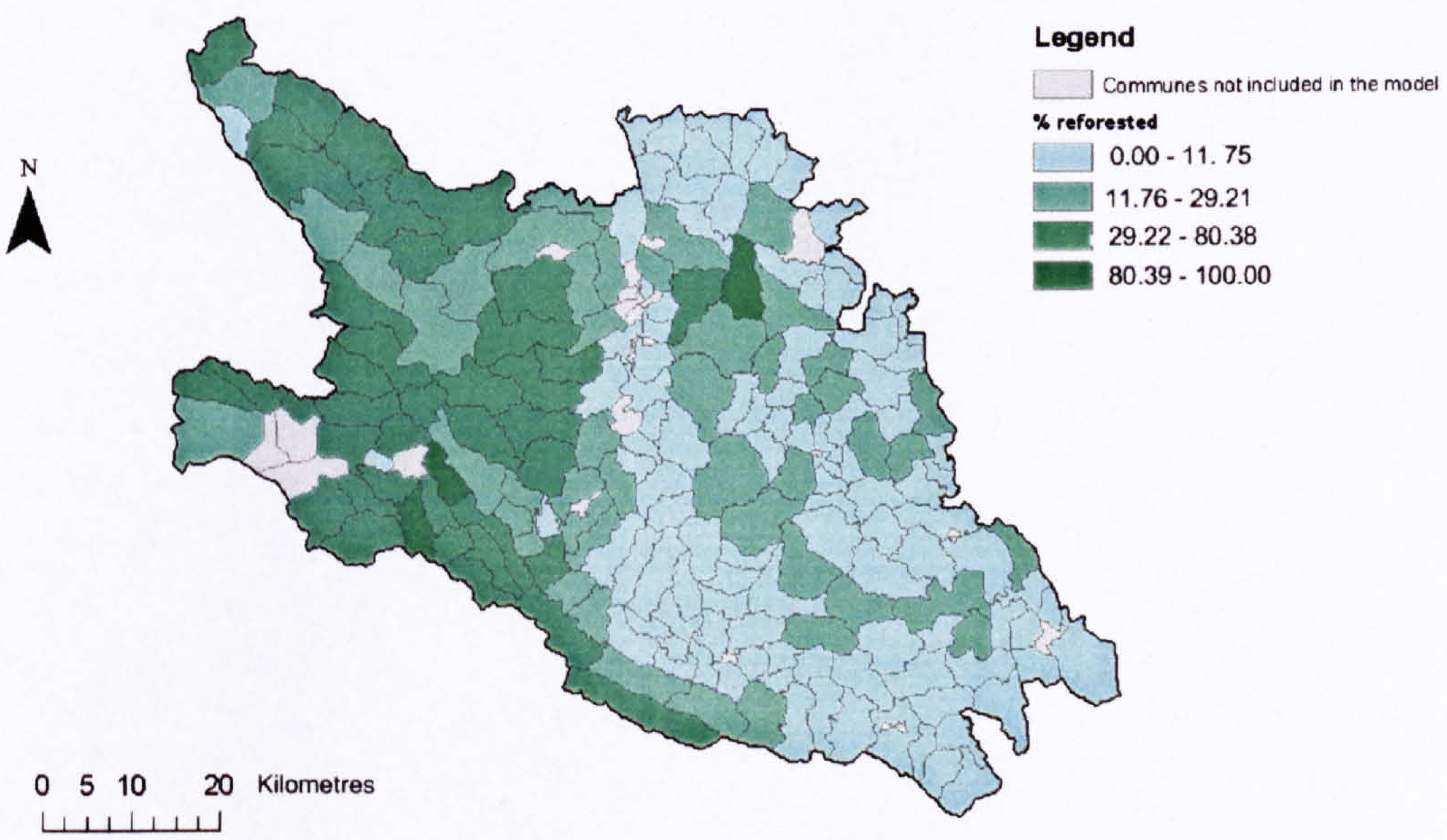
Deforested and reforested areas were distinguished by overlaying the two forest-cover maps made from the satellite image analysis. The deforested area accounts for 148.1 km^2 (with an error margin of +/- 8.3 km^2) and the reforested area for 193.9 km^2 (with an error margin of +/- 19.5 km^2). The error margin results from the presence of a large cloud of 55.6 km^2 above Mai Chau District on one of the 2000 satellite scenes, leading to an uncertainty of 1.1 per cent in the estimation of land use. This uncertainty is the percentage of the province area which was under the cloud cover and which land cover could not be classified.

Total change in forest cover between 1993 and 2000 accounts for 45.8 km^2 (error margin of +/- 27.9 km^2) which represents an increase of between 1.3 and 5.2 per cent of the total forest area. It is much less than the 11 per cent increase reported by the Statistics Department of the province for the 1994-2000 period (cf. Table 5-2, column 1).

The forest-cover maps were integrated into a GIS in order to calculate forest-cover change for each commune. Maps 5-3 and 5-4 display the two dependent variables chosen for the spatial regression analysis: (1) the percentage of forest lost and (2) the percentage of forestry land with no forest cover afforested for each commune between December 1993 and November 2000.



Map 5-3. Percentage of forest lost for each commune, Hoa Binh Province, 1993-2000, derived from Landsat TM and ETM+ satellite images
Source: this study



Map 5-4. Percentage of forestry land afforested for each commune, Hoa Binh Province, 1993-2000, derived from Landsat TM and ETM+ satellite images
Source: this study

Spatial patterns of forest-cover change are clearly detectable: areas with high percentage of deforestation are located in the south eastern part of the province, while the areas with high percentage of afforestation/reforestation are located in the western part of the province. Regression models were designed and run in order to investigate the roots of these patterns and identify the main drivers for deforestation and afforestation / reforestation at the provincial level.

IV. Regression analysis

IV.1. GWR analysis

GWR presents a promising alternative to global spatial analysis by allowing the analyst to examine the spatial variations that might exist in the relationships between the dependent and the independent variables across a study region. For example, deforestation is commonly associated with proximity to roads. Nevertheless, depending on the local context, the relationships between these two variables might differ. In places where roads connect to nearby wood processing industries, the distance to roads might be negatively correlated with deforestation: locations where timber demand and opportunities for timber markets are high are likely to undergo higher rates of deforestation. However, in other areas, for instance where most land is classified as protection forestry land and timber exploitation restricted, deforestation might preferentially occur far from the roads in remote places where control and law enforcement are limited. A global spatial model can be misleading because on the average, distance to roads might not appear as affecting deforestation if both processes compensate one another. On the contrary, GWR can identify if the phenomena has a significant impact at the local level.

The conventional global regression can be expressed as:

$$\hat{y}_i = \beta_0 + \sum_k \beta_k x_{ik} + \varepsilon_i \qquad \textbf{5-5}$$

Where:

$\hat{y}_i$ is the estimated value of the dependent variable for observation i;

β_0 is the intercept, β_k is the parameter estimate for variable k;

x_{ik} is the value for the kth variable for observation i; and

ε_i is the error term.

In this equation, the parameter estimates β_k are assumed to be spatially stationary. As developed above, while such an assumption might be valid with physical processes, it is much less common for social processes (Fotheringham *et al.*, 2002). The relationship between the dependent and the independent variables might intrinsically differ because of distinct economic or political contexts. As a result, the same stimuli might lead to distinct responses depending on the location.

GWR provides a method to assess the degree of spatial non-stationarity in the relationship between dependent and independent variables. It generates a local regression equation for each observation. Each equation can be expressed as:

$$\hat{y}_i = \beta_0(u_i, v_i) + \sum_k \beta_k(u_i, v_i)x_{ik} + \varepsilon_i \qquad \textbf{5-6}$$

Where (u_i, v_i) is the coordinate location of the observation i (Fotheringham *et al.*, 1998).

The weight assigned to each neighbouring observation in Equation 5-6 is based on a distance decay function centred on observation i. This function can be conceptually represented as a kernel (Figure 5-1).

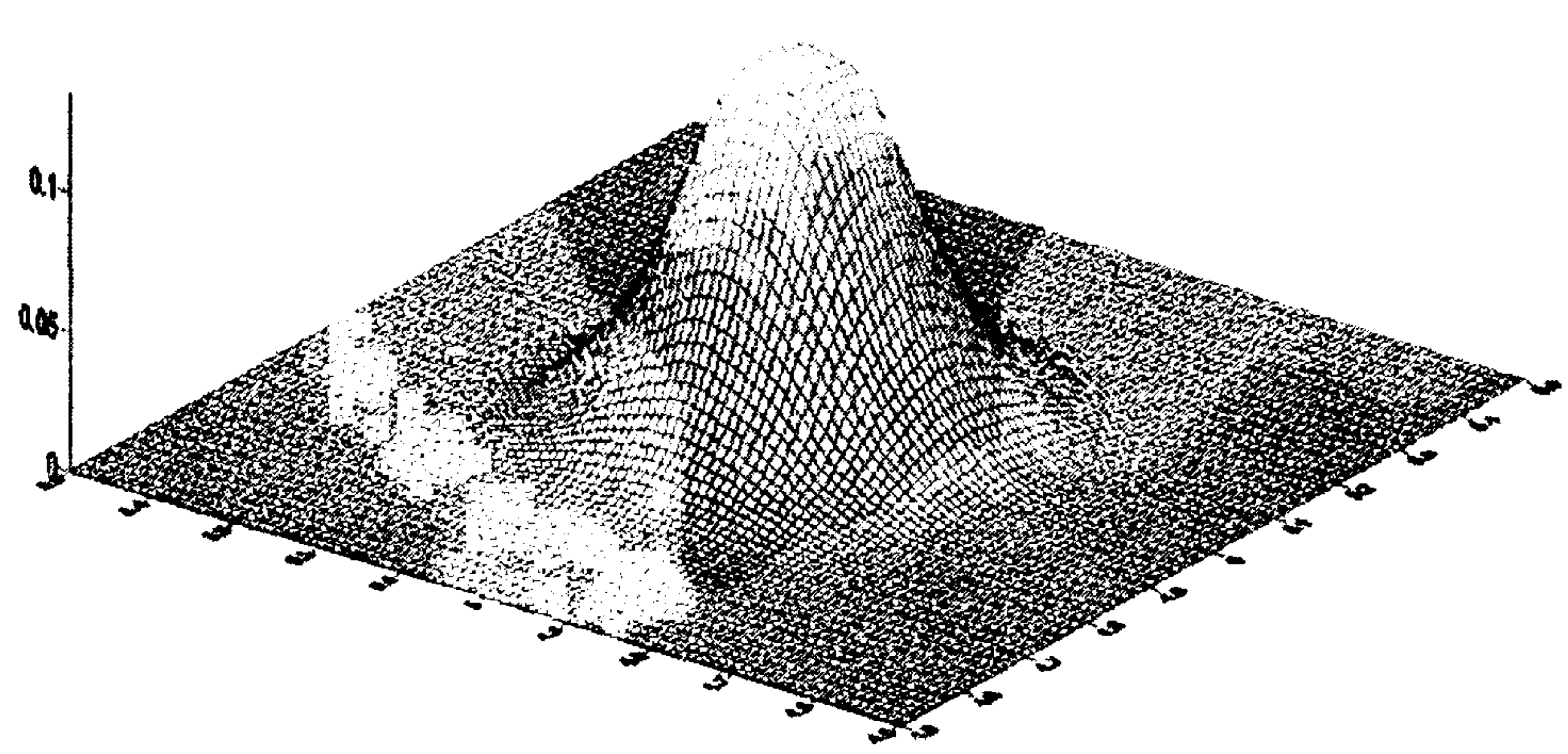


Figure 5-1. A kernel

It illustrates the distance decay function based on the coordinates of the regression point and the data points near it. The peak of the surface is the regression point; any observation under the surface receives the weight based on the height of the surface at that point.

Observations close to one another are assumed to have a greater influence on one another's parameter estimates than observations further apart. The distance decay function is adjusted by a bandwidth setting at which distance the weight rapidly approaches zero. The bandwidth is adjusted either manually or optimised using an algorithm that seeks to minimise a cross-validation score, given as:

$$CV = \sum_{i=1}^{n} (y_i - \hat{y}_{i \neq 1})^2 \quad \textbf{5-7}$$

Where n is the number of observations.

The bandwidth can also be optimised by minimising the Akaike Information Criterion (AIC) score. The AIC is a measure of the difference between the observed value and the predicted value and is defined as:

$$AIC_i = 2n\log_e(\hat{\sigma}) + n\log_e(2\pi) + n\left\{\frac{n + tr(S)}{n - 2 - tr(S)}\right\} \quad \textbf{5-8}$$

Where *tr(S)* is the trace of the hat matrix, which maps $\hat{y}$ on to y in the following manner:

$$\hat{y} = Sy \quad \textbf{5-9}$$

In addition, the user might choose either to fix the bandwidth for every observation or to allow the bandwidth to expand in areas of sparse observations and shrink in areas of dense observations. The GWR model that was selected has an adaptive bandwidth, which optimum was calculated by minimising the AIC.

Both the global and the local models were run and were compared to assess whether the GWR method offered any improvement compared to the GR model. This can be assessed in several ways. Firstly, one can compare the AIC and the coefficient of determination R^2 between the two models. The best model holds the lowest AIC and the highest R^2. A difference of three points in the AIC is considered to be significant (Fotheringham *et al.*, 2002). Secondly, the GWR model gives the results of an analysis of variance (ANOVA) test which tests the null hypothesis that the GWR model has no improvement compared to the GR model. Thirdly, the spatial non-stationarity of the relationship between the dependent variable and each independent variable provides a further estimation of the pertinence of applying GWR to the regression model. These methods are complementary and were all used in this study. The outputs of the GWR software include a parameter estimate, a t-value, and goodness-of-fit for each observation, which can then be mapped in a GIS environment allowing the analyst to interpret the results visually.

IV.2. Scenarios of forest-cover change and independent variables

Several scenarios of forest-cover change were built based on: (1) the findings from the local study of afforestation in Tien Xuan Commune presented in **Chapter 4**; (2) social science theories: for instance, in a von Thünen model (von Thünen, 1966), distance affects the extent of integration to a market system; in a Ricardian model (Ricardo, 2002), environmental variables impacts on land quality and on the choice of land use for a particular land area; in a Malthusian model higher population density leads to increased deforestation, although in a Boserup model (Boserup, 1965), higher population density results in agricultural intensification and reduced deforestation; and (3) previous studies examining the drivers for forest-cover change in Vietnam (Le Trong Cuc and Rambo, 2001; Nguyen Nghia Bien, 2001) and elsewhere (Gibson *et al.*, 2000b; Chomitz *et al.*, 2006). The major scenarios tested are presented in Tables 5-7 and 5-8.

Table 5-7. Scenarios of deforestation

Scenario	Tested hypothesis
Agricultural expansion	Deforestation in Vietnam is linked with the conversion of forest to agricultural land, driven by food demand and poverty.
Timber demand	Deforestation is driven by legal and illegal logging fostered by timber demand.
Shifting cultivation	Deforestation is caused by shifting cultivation practised by ethnic minority groups.

Table 5-8. Scenarios of afforestation/reforestation

Scenario	Tested hypothesis
FLA (achieved in 1997)	If forestry land is allocated on a long term basis, farmers take greater care of the land and are more willing to make long-term investments, e.g. establish tree plantations.
Timber demand	When the timber demand is high, tree plantations are a more attractive land-use option for farmers than annual cropping. Whether tree plantation is a viable option for farmers thus mainly depends on market, biophysical and institutional conditions (secure land-use rights).
Annual cropping not viable	In areas of high soil sensitivity to degradation, fixed cultivation (resulting from FLA to households) might lead to a rapid decrease in soil fertility and yields. As a result, farmers stop cultivating and either let land regenerating or plant trees.
Urbanisation	Off-farm employment releases the agricultural pressure on the uplands and forest re-grows by natural regeneration.

The independent variables (Tables 5-9 to 5-12) were chosen in order to test the scenarios presented in Tables 5-7 and 5-8.

IV.2.1. Social variables

Table 5-9 presents the social variables selected. All these variables are aggregate data at the commune level from 1999.

Table 5-9. List of independent social variables selected for analysis of determinants of deforestation and afforestation/reforestation at the commune level (Number of observations N=212)

Name	Definition	Unit	Mean	Standard deviation	Source
PopDens	Population density	no./ha	192.33	151.15	1999 Population and Housing census
P0	Poverty rate		0.67	0.13	Estimation of Minot *et al.* (2003) from the 1999 Population and Housing census
PctKinh	Percentage of Kinh population	%	16.60	19.63	1999 Population and Housing census
PctMuong	Percentage of Muong population	%	69.30	31.64	1999 Population and Housing census
PctTay	Percentage of Tay population	%	4.32	17.53	1999 Population and Housing census
PctThai	Percentage of Thai population	%	6.26	20.66	1999 Population and Housing census

The incidence of poverty (also called poverty rate) is defined in this chapter as the proportion of households whose per capita expenditure is under the overall poverty line as defined in the 1997-1998 Vietnam Household Living Standard Survey by the GSO of Vietnam[43]. It was estimated at the commune level by Minot *et al.* using the "small area estimation" method (Minot *et al.*, 2003). According to Minot *et al.* (2003), these disaggregated data should be handled with caution, as some estimates rely on a small number of households and might hold relatively high standard errors. Their use as an independent variables is however valid (Elbers *et al.*, 2005).

IV.2.2. Economic variables

Table 5-10 presents the variables that were considered in the model to assess the impact of the economic context on forest-cover change.

[43] The overall poverty line is based on the cost of purchasing food equivalent to 2100 calories per capita per day and a set of basic non-food items. The overall poverty line was set at 1,790,000 VND in 1998 (the exchange rate was: 1 USD=12,000 VND in 1998).

Table 5-10. List of independent economic variables selected for analysis of determinants of deforestation and afforestation/reforestation at the commune level (N=212)

Name	Definition	Unit	Mean	Standard deviation	Source
DstSFE	Linear distance from the commune centroid to the nearest SFE	km	18.10	11.01	GIS
SFE	Presence of one or more SFEs in the commune or in the neighbouring commune	Ordinal variable			GIS
DistWdInd	Mean linear distance over the commune to a wood processing industry	km	25.88	15.48	GIS
WoodInd	Presence of a wood processing industry in the commune or in the neighbouring commune	Ordinal variable			
DstRdLog	Mean linear distance over the commune to the log road	km	23.64	15.50	GIS
DstAllrd	Mean distance over the commune to all roads weighted with slope	km	5.74	4.45	GIS
DstHighw	Mean linear distance over the commune to highways	km	8.79	6.77	GIS
DstMnRd	Mean linear distance over the commune to roads including highways and main roads	km	3.84	2.75	GIS
DstHanoi	Linear distance from the commune centroid to Hanoi	km	67.24	17.22	GIS
DstHoaB	Linear distance from the commune centroid to Hoa Binh	km	29.91	14.86	GIS

The SFEs included in the model are the sub-units of the central state-owned company VINAFOR. It is expected that the proximity of a SFEs is positively correlated with forest-cover increase for two reasons: (1) SFEs have established tree plantations on state-owned land, and (2) they have provided incentives for tree plantation (e.g. the supply of free saplings and fertilisers) from 1992 to 1998 under Program 327 and afterwards under the 5MHRP. They might also have contributed to reduce deforestation by contracting farmers to take care of forests on protection forestry land. The location of SFEs and wood processing industries was provided by the Service of Planning of the DARD of Hoa Binh.

The wood processing companies included in the model are the largest ones with a semi-industrial processing unit. The log road is the preferred route for legal and illegal saw log transportation (extracted from a map compiled by Dr. Daniel Muller, personal communication). It leads to the village of Huu Bang (*Hữu Bằng*) in Thach That (*Thạch Thất*) District, Ha Tay (*Hà Tây*) Province, a furniture area known for its legal and illegal log marketing. Other spatial data for roads, rivers and administrative units come from maps from the DONRE of Hoa Binh Province.

IV.2.3. Physical variables

The list of physical variables used in this analysis is presented in Table 5-11.

Table 5-11. List of independent physical variables selected for analysis of determinants of deforestation and afforestation/reforestation at the commune level (N=212)

Name	Definition	Unit*	Mean	Standard deviation	Source
AreaAgHh	Average area of paddy field per household	ha/hh	0.53	0.41	Land-use map 1985 and GIS
AreaFlHh	Average area of forestry land per household	ha/hh	3.42	3.59	Topographic map and GIS
AreaWrHh	Average area of water body per household	ha/hh	0.18	0.70	Soil map and GIS
AreaFSHh	Average area of forestry land with high sensitivity per household	ha/hh	0.84	1.53	Topographic, soil maps and GIS
PctSl35	Percentage of land area with slope between 25° and 35°	%	12.28	9.37	Topographic map and GIS
PctSl60	Percentage of land area with slope between 35° and 60°	%	3.90	4.41	Topographic map and GIS

* *Areas are given in hectares/household (ha/hh)*

The 1:50,000 soil and topographic maps were acquired at the Division of Mapping and Ground Measurement of the National Institute of Agricultural Planning and Projection of Vietnam.

The sensitivity of forestry land to degradation was estimated using soil type maps and topography (data on the depth of the top soil layer were not available). The 22 types of soils present in Hoa Binh Province were classified under three categories: A, B and C, depending on their potential fertility and suitability for annual crop cultivation (Nguyen Van Bo *et al.*, 2002). The soils classified under category A are soils with a potential high fertility or suitable for rice cultivation. The soils under category B are soils with a potential medium fertility or suitable for cash crop (e.g. maize) cultivation. The soils under category C are soils with an inherent low fertility or suitable for tree plantations and agroforestry. Forestry land with a high sensitivity was defined as the land with: (1) a soil under category C; or (2) a soil under category B and with a slope greater than 25°. The combination of slope steepness with local institutions was found to be critical factor in sustainable forest management (Schweik, 2000). The level of observation (commune) allowed considering only slope steepness in the regression models.

Collected maps did not include maps of land classified as forestry land. Forestry land was estimated in this study as land with a slope greater than 5° and with a soil category different than category A. Although forestry land is officially land with a slope greater than 25°, the area estimated with a threshold of 5° corresponds best to the official figures of forestry land area given by the FPD of Hoa Binh Province (**Annex F**). The area of paddy field was calculated with the 1985 land cover map. The 1985 map was preferred to the other maps collected from 1993, 1999 and 2005 because the latter informed on land classification rather than on actual land use. It is estimated that this area has not much changed between 1985 and 2000 as the whole superficies of lowland areas available in the province had been cultivated already since the 1980s (it was checked in the figures of areas of paddy fields from 1976 to 2001 from the Statistics Department of Hoa Binh).

IV.2.4. Institutional variables

Lastly, a set of institutional variables was selected in order to assess the impact of FLA in the province (Table 5-12).

Table 5-12. List of independent institutional variables selected for analysis of determinants of deforestation and afforestation/reforestation at the commune level (N=10)

Name	Definition	Unit	Mean	Standard deviation	Source
AreaAlHh	Average area of forestry land allocated per household	ha/hh	0.86	0.72	FPD 1999
AreaAlCH	Average area of forestry land allocated and contracted per household	ha/hh	1.75	1.26	FPD 1999
PctFlAl	Percentage of forestry land area allocated	%	37.27	13.67	FPD 1999
PctFlAC	Percentage of forestry land area allocated and contracted	%	73.62	13.66	FPD 1999

A distinction was made between production forestry land for which property rights were given to households (i.e. land allocated), and production and protection forestry land for which property rights were given or which was contracted for protection or afforestation to households. Data on FLA were only available at the district level, so it was assumed that these variables were uniform over the district.

IV.3. Issues to consider prior and during the analysis

IV.3.1. Examining and defining the dataset

Of the 212 communes counted in the province in 1999, the 17 communes classified as 100 per cent urban (GSO, 2001) were removed from the dataset, as well as the three communes that were largely masked by the cloud on the 2000 satellite image. Scatter plots for the dependent variables and each independent variable were drawn to detect outliers (**Annex G**). No abnormal data were detected. GWR was finally run on a total of 194 communes (a figure of approximately 150 observations is considered to be a minimum to run the model (Charlton, personal communication, November 29 2006).

The Modified Areal Unit Problem (MAUP)

The MAUP is an issue of serious concern in global spatial analysis. Fotheringham *et al.* (1995) identified two components in the MAUP: (1) various correlation values can be obtained from the same statistical analysis at several levels of data aggregation, and (2) the selection of zones into which data are grouped can also affect results. Fotheringham *et al.* (2002) tested the sensitivity of GR and GWR results to MAUP by examining the surface of local parameter estimates at several levels of aggregation. GR results confirmed that the level of aggregation significantly affects the results of the global model. In the GWR model, the surfaces of the local parameter estimates at several levels of aggregation were relatively stable. The study concluded that the MAUP affects GWR models to a lesser extent than global models.

IV.3.2. Multicollinearity

Multicollinearity is a problem both in GR and GWR. It is all the more likely to occur because of the use of aggregate socio-economic data. When two variables are linearly dependent, it is difficult for the regression model to attribute the change in the dependent variable to one variable or to another and there is a risk of inaccuracy in the calculated parameter estimates. A simple way to assess collinearity is to check the correlation among independent variables. However, a low correlation does not necessarily imply the absence of collinearity. The standard errors of the local parameter estimates were thus also carefully checked.

The collinearity of independent variables in the global model was assessed with the correlation matrix (**Annex H**). The correlation analysis was undertaken using the Statistical Package for Social Sciences (SPSS). Whether the correlation coefficient is significant or not depends on the sample size. To test the null hypothesis that the true correlation coefficient ρ is equal to zero, the following t-statistic is usually used (Rogerson, 2001):

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} \qquad \textbf{5-10}$$

Where n-2 is the degree of freedom and r is the Pearson's correlation coefficient.

However, this test assumes that the values (x,y) of each variable of the dataset are independent, which is very unlikely in the case of spatial data. Haining (1990) does not recommend using conventional procedures to test for the significance of the correlation coefficient when spatial correlation exists between the variables.

Several scatter plot matrixes (**Annex I**) were drawn in order to assess trends between variables and define a rule of the thumb for a threshold value for r indicating strong correlation. The independent variables with a Pearson's correlation coefficient of an absolute value greater than 0.75 were considered to be significantly correlated. Values higher than 0.45 were considered to show a moderate correlation. These variables were not used simultaneously in the model tested, but the existing linear correlation between these variables was considered when interpreting the results. When a strongly correlated variable is selected in the final model, its effects are the simultaneous effect of itself and of the correlated variable (Du, 2006).

There are also specific problems of local multicollinearity in GWR. Wheeler and Tiefelsdorf (2005) argue that the local parameter estimates might be collinear even if the associated independent variables in the global model are uncorrelated. It might introduce a bias in the results as the local parameters tend to exhibit artificial inverse patterns. Wheeler and Tiefelsdorf (2005) propose several methods to assess the multicollinearity in local parameter estimates. I selected the methods that could be performed with my computing resources: calculating the correlation matrix, drawing scatter plots of the local parameter estimates, linked with a careful examination of the local standard errors.

V. *Results*

V.1. Multicollinearity

The correlation matrix of the independent variables (**Annex H**) indicates that the following variables are strongly correlated (r>0.75) in the global model (Table 5-13).

Table 5-13. Independent variables strongly correlated

Variable	DstWdInd	DstRdLog	DstRdLog	AreaAlCH
Correlated variable	DstHoaB	DstHoaB	DstWdInd	AreaAlHh
Pearson's correlation coefficient	0.88	0.81	0.81	0.94

Source: this study

The distances to Hoa Binh (DstHoaB), the log road (DstRdLog) and wood processing industries (DstWdInd) are strongly correlated. This is not very surprising considering their location. The area of allocated and contracted forestry land to households (AreaAlCH) is strongly correlated with the area of allocated land to households (AreaAlHh), which is natural considering the definition of these two variables.

V.2. Choice of the best global and local models

Both GR and GWR models were run simultaneously under the software package GWR 3x developed by Fotheringham, Charlton and Brunsdon (the version 2x is presented in Fotheringham *et al.*, 2002). First, models were created to test each scenario, using several sets of variables (**Annex J**). Then, depending on the performance of the models, relevant variables were selected to create a model that combines several scenarios (tables with all models tested can be found in **Annex J**). Both for the deforestation and afforestation/reforestation analyses, combined models performed better than models describing a single scenario. The best model was chosen depending on the R^2 and AIC values for both models and taking into account multicollinearity. Although the best GR model does not necessarily correspond to the best GWR model, efforts were made to find a compromise to maximise R^2 and AIC values for both to select the final model.

V.3. Deforestation

V.3.1. Model selection

Table 5-14 presents the combined models of deforestation among which the final choice was made (see **Annex J** for the list of all tested models).

Table 5-14. Models for the final selection of the best model

Model	Parameter	AIC (GR)	R^2 (GR)	Parameter estimate<0 and t <-1.99 (GR)	Parameter estimate>0 and t >1.99 (GR)	AIC (GWR)	R^2 (GWR)
A	PctKinh AreaAgHh PopDens DstHanoi WoodInd DstAllRd	1780.82	0.38	DstHanoi DstAllRd	AreaAgHh	1709.51	0.73
B	DstHanoi AreaAgHh DstAllRd	1783.46	0.36	DstHanoi DstAllRd	AreaAgHh	1729.97	0.75
C	DstRdLog DstHanoi AreaAgHh DstAllRd	1780.86	0.37	DstHanoi DstAllRd	DstRdLog	1727.71	0.71
D	WoodInd DstHanoi AreaAgHh DstAllRd PctKinh	1782.12	0.37	DstHanoi DstAllRd	AreaAgHh PctKinh	1747.91	0.73
E	DstHanoi WoodInd DstAllRd PctSl35	1785.44	0.36	PctSl35 DstHanoi DstAllRd		1692.55	0.73
F	DstHanoi DstAllRd	1789.55	0.34	DstHanoi DstAllRd		1689.01	0.78

Source: this study

All local models perform better than the global ones, with lower AIC and R^2. The global models explain around 34-38 per cent of the variance (Table 5-14) and provide a fairly poor replication of the data. As the best local model does not correspond to the best global model (Table 5-14), a balance between global and local performance was sought. In order to choose the best model, local and global AIC were compared. The AIC of the global models do not vary significantly, with the lowest AIC of 1780.82 for model A and the highest of 1789.55 for model F. On the contrary, there is a larger interval in the difference between the lowest and highest AIC of the local models (1689.01 and 1747.91). Therefore, the selection for the best model focused on the comparison of local AICs. Two models stood out in this respect: models E and F. As shown and explained in **Annex K**, the maps of the local parameter estimates of model F allowed a more sensible interpretation of deforestation than those of model E. Model F was thus chosen as the best model.

V.3.2. Global model

The independent variables of this model are *DstHanoi* and *DstAllRd*. Results of the global model are presented in Table 5-15 below.

Table 5-15. Results of the best GR model for deforestation

	N*	Parameter estimate	t-value	Significance	Expected sign for the parameter estimate
Intercept	194	82.98	11.88	At 1% in a two-tail test	N/A
DstHanoi	194	-0.34	-3.24	At 1% in a two-tail test	<0 under the timber demand hypothesis
DstAllRd	194	-3.31	-8.19	At 1% in a two-tail test	<0 under the timber demand hypothesis

* *N=Number of observations*
Source: this study

Both independent variables are significant in the global model. The negative relationship between the percentage of forest lost and the distance to Hanoi and roads are in accordance with the von Thünen model (in which land use is related to accessibility to markets). It suggests that deforestation was primarily driven by timber demand or agricultural expansion. As shown in Table 5-14, the inclusion of the presence of wood industries and percentage of land slope over 35° in the model slightly improved the GR model, with a similar performance of the GWR model, suggesting that these variables also influenced deforestation, but not in such a significant way as the distance to roads and to Hanoi. Other variables improved the global model: *AreaAgHh*, *DstRdLog* in model C, and also *PctKinh* and *PopDens* in model A, but the associated local models performed less well. Only *AreaAgHh* and *DstRdLog* were significant in the GR model. It suggests that these variables have had an impact from a meso-scale perspective but are not significant when modelling the relationships at a finer spatial scale. The GWR model allows to explore further the relationships between deforestation and the variables *DstHanoi* and *DstAllRd* by assessing whether they support the assumptions made from the global model and whether they exhibit any significant spatial variability.

V.3.3. GWR model

The GWR model has significantly improved the global model: the AIC has decreased from 1789.55 in the global model to 1689.01 in the GWR model. The adjusted R^2 has also increased from 0.34 in the global model to 0.78 in the GWR model, which implies the latter gives a much better explanation of deforestation than the global model. This is confirmed by the results of the ANOVA test provided by the GWR software: the F value which tests the null hypothesis that the GWR model has no improvement over a global model indicates that this hypothesis is rejected with significance at 1 per cent level (F=7.37). The descriptive statistics related to the local parameter estimates are presented in Table 5-16.

Table 5-16. Descriptive statistics of the local parameter estimates in the best GWR model for deforestation

	N	Mean	Standard deviation
Intercept	194	96.66	206.65
DstHanoi	194	-0.32	2.97
DstAllRd	194	-4.48	5.33

Source: this study

The range of the local parameter estimates can be compared with a confidence interval around the global estimate of the equivalent parameter. Considering that 68 per cent of values in a normal distribution are within ± 1 standard deviation of the mean, and 50 per cent of the local parameter estimates are in the inter-quartile range, it gives an informal way of comparison. If the inter-quartile range is greater than twice the standard deviation of the global estimate then it suggests that the relationship might be non-stationary. For all parameters, the interquartile range is much greater than twice the standard error (Table 5-17), which indicates a non-stationary relationship.

Table 5-17. Assessment of the spatial variability of the parameters for the best model of deforestation

Parameter	Standard error (SE) (GR)	2*SE (GR)	Lower quartile (GWR)	Upper quartile (GWR)	Interquartile range (GWR)
Intercept	6.98	13.97	-37.5	186.21	223.72
DstHanoi	0.11	0.21	-1.79	1.37	3.16
DstAllRd	0.4	0.81	-8.3	-0.44	7.86

Source: this study.

Lastly, the spatial variability in the local parameter estimates was assessed with the Monte-Carlo test. Results indicate that all parameters exhibit spatial variability with significance at 0.1 per cent level. There is thus a high probability that the spatial variation of the parameters exhibited in the GWR model did not happen by chance. This issue was explored by mapping the output data under ArcMap (see further in this section).

Collinearity between the local parameter estimates was assessed with scatter plots (Figure 5-2).

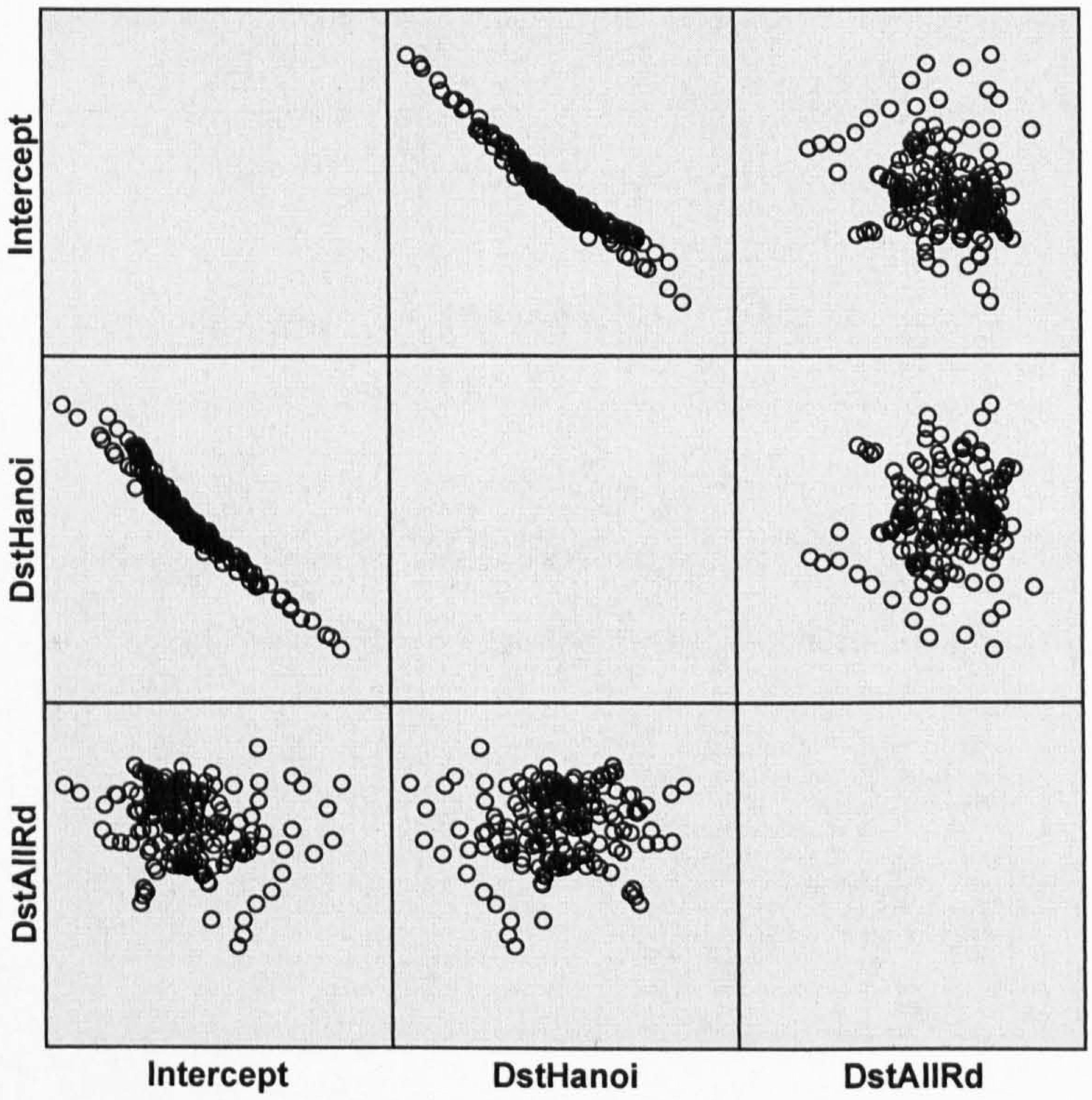


Figure 5-2. Scatter plots of the local parameter estimates for the best model of deforestation
Source: this study

DstHanoi is strongly correlated with the Intercept term. This relationship is considered to be quite natural as the local intercept is a function of the slope of the local parameters (Du, 2006). When one parameter dominates over the others, the local intercept is highly correlated with the local slope for that relationship (Du, 2006). It indicates that DstHanoi was the most influential driver of deforestation. The results of the scatter plots are supported by the correlation matrix, Table 5-18.

Table 5-18. Correlation matrix of the local parameter estimates the best deforestation model

Parameter	Intercept	DstHanoi	DstAllRd
Intercept	1.000		
DstHanoi	**-0.970**	1.000	
DstAllRd	0.261	0.125	1.000

Source: this study

The correlation matrix indicates that there is no evidence of a collinearity problem between the independent variables at the global and local level that could have affected the relationships between variables in the models. Table 5-19 displays the descriptive statistics for local standard errors.

Table 5-19. Descriptive statistics for local standard errors associated with variables of the best deforestation model

Variable	N	Range	Minimum	Maximum	Mean	Variance
DstHanoi	194	1.82	0.50	2.32	1.21	0.13
DstAllRd	194	6.85	0.65	7.50	2.35	1.85

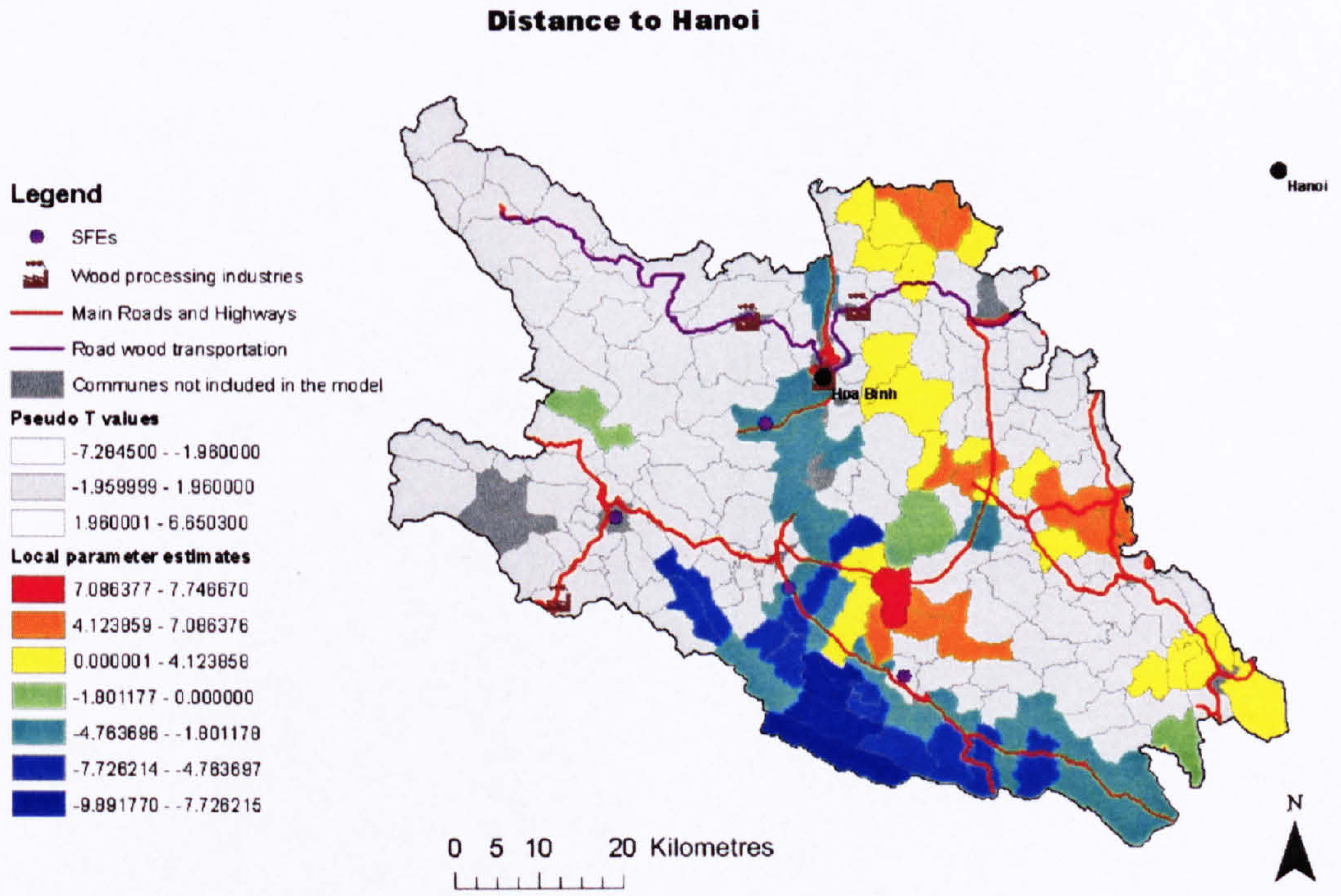
Source: this study

The range and variance of the local standard errors associated with the two independent variables do not indicate the presence of collinearity between the two variables.

V.3.4. Mapping results

The local parameter estimates were mapped according to a standard deviation classification, manually adjusted by setting up one value as the global value of the parameter estimate, to get a rough estimation of how much local values differ from the global estimate, and another value as 0, to visualise where relationships are negative and positive. In addition, a pale grey mask was applied on the local parameter estimate map to hide all values that are not significant at 5 per cent for a two-tailed test (absolute t-value lower than 1.96).

The distance to Hanoi is strongly negatively correlated with the percentage of land deforested in the south and centre of Hoa Binh Province (Map 5-5). In several patchy areas located in the eastern part of the province – including Tien Xuan Commune – the relationship between these two variables is the opposite: the closer to the capital city, the lower the percentage of land deforested. The varying nature of the relationship between the two variables does not allow any firm conclusion to be drawn as on the impact of timber demand on deforestation.

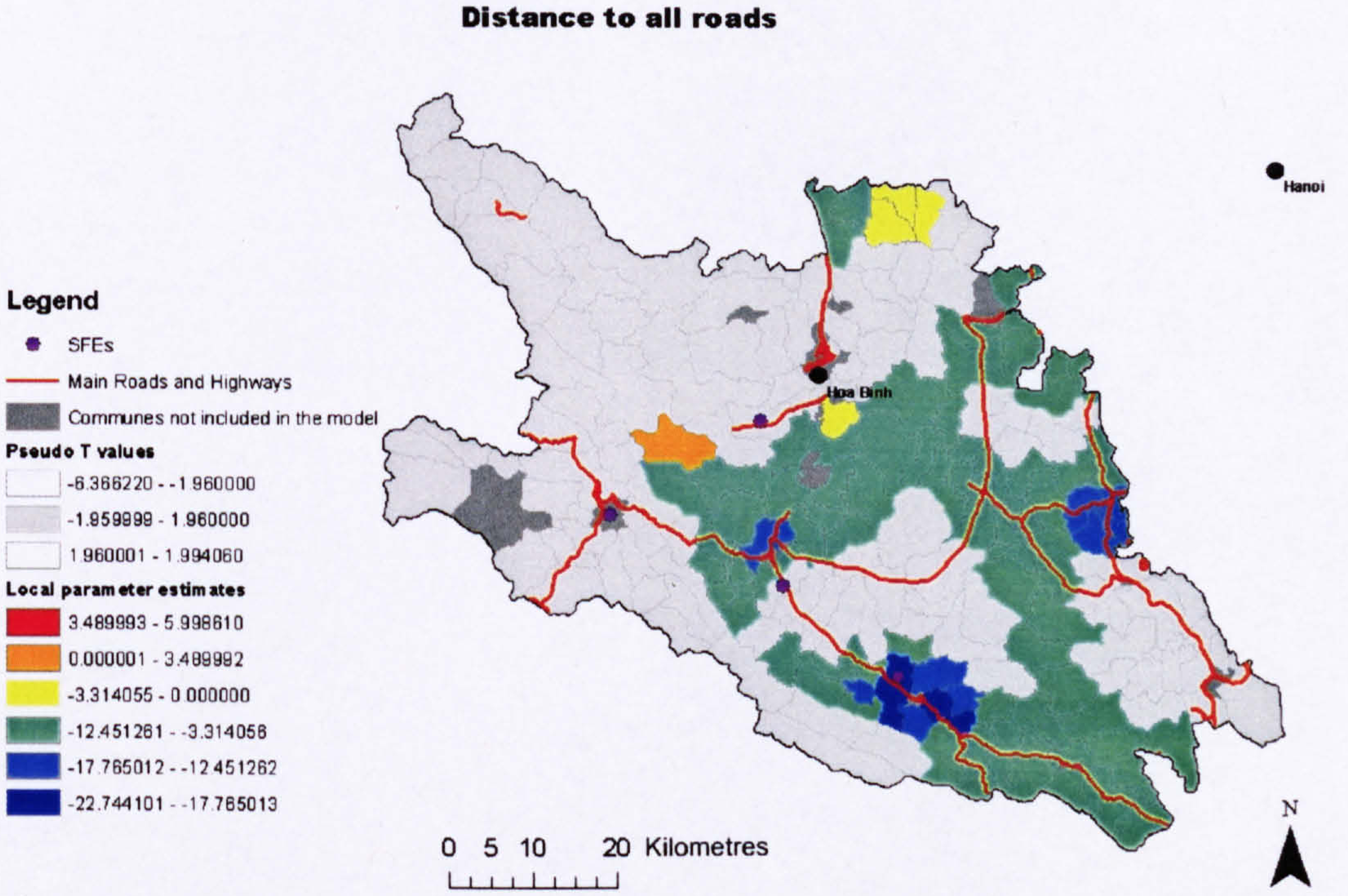


Map 5-5. Surface of local parameter estimates associated with the distance to Hanoi (DstHanoi) in the best deforestation model
Source: this study

In almost all areas where the distance to roads is significantly correlated with the percentage of forest loss, the two variables are negatively correlated (Map 5-6). It suggests that deforestation is related to:

1) accessibility – the more accessible is the area, the higher the probability of deforestation. This assumption is reinforced by the fact that *PctSl35* improved the global model; and/or

2) market integration – the closer to the transportation infrastructures linking to markets, the higher the probability of deforestation. This assumption is also reinforced by the fact that *WoodInd* improved the global model.



Map 5-6. Surface of local parameter estimates associated with the distance to all roads (DstAllRd) in the best deforestation model
Source: this study

It can be concluded that the results of the GWR model, supported by the findings related to the GR models, indicate that deforestation in Hoa Binh Province between 1993 and 2000 was constrained by accessibility and market integration. Accessibility can be linked to the agricultural expansion scenario. However, in such a scenario I would have expected the variable *AreaAgHh* to be correlated with deforestation: the less agricultural land per capita, the greater the need to expand cultivation in the uplands and to deforest. Results indicate that this variable improved the global model but decreased the goodness-to-fit of the GWR model (cf. Table 5-14. The other plausible scenario that would be in line with the GWR findings is the timber demand scenario. In all cases, there is no evidence that the land-use practices of ethnic minority groups were a prominent driver of deforestation.

V.4. Afforestation/Reforestation

V.4.1. Model selection

As for deforestation, the scenarios of afforestation/reforestation presented in Table 5-8 were first tested individually before building a set of models combining two or three scenarios (see **Annex J** for the list of all tested models). The final models from which the ultimate selection was made are presented in Table 5-20.

Table 5-20. Models for the final selection of the best model of afforestation/reforestation

Model	Parameter	AIC (GR)	R^2 (GR)	Parameter estimate <0 and t<-1.99 (GR)	Parameter estimate >0 and t>1.99 (GR)	AIC (GWR)	R^2 (GWR)
A	PctFlAc SFE DstHanoi WoodInd DstHighw AreaFSHh PctSl35	1657.76	0.38	DstHighw PctFlAc	DstHanoi WoodInd AreaFSHh PctSl35	1652.46	0.46
B	PctFlAC DstHanoi WoodInd DstHighw AreaFSHh PctSl35	1656.46	0.38	DstHighw PctFlAC	DstHanoi WoodInd AreaFSHh PctSl35	1652.21	0.47
C	PopDens P0 PctFlAC DstHanoi WoodInd DstHighw AreaFSHh PctSl35	1646.13	0.42	PopDens DstHighw PctFlAC	DstHanoi WoodInd	1567.90	0.72
D	PopDens PctFlAC DstHanoi WoodInd DstHihgw	1646.63	0.41	PopDens DstHighw PctFlAC	DstHanoi WoodInd	1570.73	0.69

Source: this study

Models C and D have lower AIC and R^2 for both GR and GWR models compared with other models. The GWR model C has a slightly lower AIC than D, but it is hardly significant. Model D was finally selected as the best model because model C does not significantly improve model D and has a higher degree of complexity (more variables).

V.4.2. Global model

With a coefficient of determination of 41 per cent, the process of afforestation/reforestation in Hoa Binh Province is better explained by the GR model than was deforestation. According to the latter, forest-cover increase in Hoa Binh Province from 1993 to 2000 was significantly affected by population density, the distance to Hanoi, the proximity or presence of a wood processing industry, the distance to highways and the percentage of forestry land allocated and contracted to households (Table 5-21).

Table 5-21. Results of the best GR model for afforestation/reforestation

Parameter	N	Estimate	t-value	Significance	Expected sign for the parameter estimate
Intercept	194	22.3	2.38	At 1% in a one-tail test	N/A
PopDens	194	-0.05	-5.67	At 1% in a two-tail test	<0
DstHanoi	194	0.56	6.8	At 1% in a two-tail test	<0 under the timber demand and urbanisation hypothesis
WoodInd	194	16.94	3.74	At 1% in a two-tail test	>0 under the timber demand hypothesis
DstHighw	194	-0.68	-3.22	At 1% in a two-tail test	<0 under the timber demand and urbanisation hypothesis
PctFlAC	194	-0.39	-3.57	At 1% in a two-tail test	>0 under FLA hypothesis

Source: this study

Preliminary hypotheses on the drivers for forest-cover increase can be drawn from the results of the GR model shown in Table 5-20. The role of population density is in accordance with Malthusian theories (the lower the population density, the higher the probability of afforestation/reforestation) but the value of the parameter estimate indicates that its contribution to forest-cover increase was very limited. The sign of the parameter estimate of *DstHanoi* does not support the urbanisation or timber demand scenario: the further from Hanoi, the higher the probability of afforestation/reforestation. On the contrary, the positive correlation between forest-cover increase and the proximity of a wood processing industry suggests that forest-cover increase was driven by timber demand: the closer to the wood processing industry, the higher the likelihood of afforestation/reforestation. The timber demand scenario is also somehow supported by the negative correlation between forest-cover increase and the distance to highways. Furthermore, the global parameter estimate for

WoodInd is particularly high. Lastly, results from the GR model suggest that FLA to households did have an impact, but the latter is opposite to policy intentions: the higher the percentage of forestry land allocated and contracted to households, the lower the area of forestry land reforested. These relationships are further investigated with the GWR model.

V.4.3. GWR model

The GWR model has significantly improved the GR model. The AIC has decreased from 1646.63 in the global model to 1570.73 in the GWR model. The adjusted R^2 has increased from 0.41 in the global model to 0.69 in the GWR model, which implies the latter gives a much better explanation of forest-cover increase. This is confirmed by the results of the ANOVA test provided by the GWR software: the F value which tests the null hypothesis that the GWR model has no improvement over a global model indicates that this hypothesis is rejected with significance at 1 per cent level (F= 6.14).

Table 5-22 presents the descriptive statistics related to the local parameter estimates of the best local model.

Table 5-22. Descriptive statistics related to the local parameter estimates of the best local model

Parameter	N	Mean	Standard deviation
Intercept	194	33.3	84.61
PopDens	194	-0.08	0.09
DstHanoi	194	0.16	0.98
WoodInd	194	4.5	46.41
DstHighw	194	-1.21	1.84
PctFlAC	194	-0.12	0.49

Source: This study.

The output data from the model indicate that all variables are significantly non-stationary over space (Table 5-23). The interquartile range of the variables is higher than twice the value of the standard error.

Table 5-23. Assessment of the spatial variability of the parameters for the best model of afforestation/reforestation

Parameter	Standard error (SE) (GR)	2*SE (GR)	Lower quartile (GWR)	Upper quartile (GWR)	Interquartile range (GWR)
Intercept	9.36	18.71	-12.19	51.82	64.01
PopDens	0.01	0.02	-0.08	-0.03	0.05
DstHanoi	0.08	0.16	-0.57	0.65	1.22
WoodInd	4.53	9.06	-1.22	21.22	22.44
DstHighw	0.21	0.43	-2.32	0.12	2.44
PctFlAC	0.11	0.22	-0.48	0.27	0.76

Source: this study

The spatial variability was confirmed by the Monte Carlo test, which suggests that all variables except *PctFlAC* exhibit spatial non-stationarity with significance at 0.1 per cent level and *PctFlAC* with significance at 5 per cent level.

V.4.4. Multicollinearity in the local parameter estimates

Multicollinearity between the local parameter estimates was investigated with scatter plots (Figure 5-3).

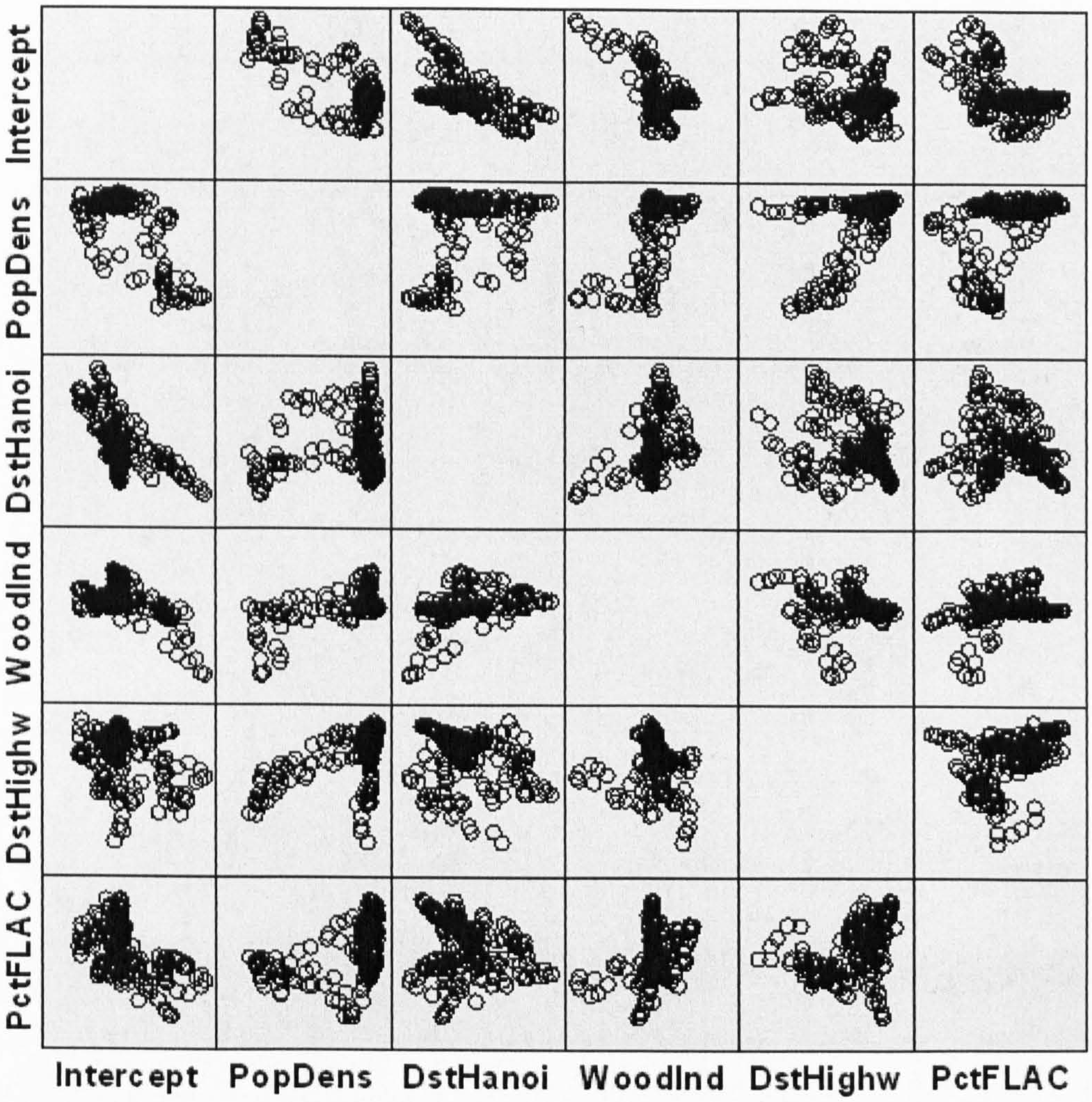


Figure 5-3. Scatter plots of the local parameter estimates of the best afforestation/reforestation model

The scatter plots do not indicate any strong collinearity among the local parameter estimates. These results are backed up by the correlation matrix (Table 5-24). Therefore, there is no evidence of multicollinearity between variables in the global model or between the local parameter estimates.

Table 5-24. Correlation matrix of the local parameter estimates of the best afforestation/reforestation model

Parameter	Intercept	PopDens	DstHanoi	WoodInd	DstHighw	PctFIAC
Intercept	1.000	-0.709	-0.674	-0.614	-0.297	-0.535
PopDens	-0.709	1.000	0.243	0.586	0.485	0.444
DstHanoi	-0.674	0.243	1.000	0.400	-0.196	-0.181
WoodInd	-0.614	0.586	0.400	1.000	-0.131	0.296
DstHighw	-0.297	0.485	-0.196	-0.131	1.000	0.356
PctFIAC	-0.535	0.444	-0.181	0.296	0.356	1.000

Source: this study

Table 5-25 displays the descriptive statistics for local standard errors.

Table 5-25. Descriptive statistics for local standard errors associated with variables of the best afforestation/reforestation model

Variable	N	Range	Minimum	Maximum	Mean	Variance
PopDens	194	0.09	0.01	0.10	0.03	0.00
DstHanoi	194	0.88	0.31	1.19	0.56	0.04
WoodInd	194	74.83	0.00	74.83	16.59	360.25
DstHighw	194	1.26	0.40	1.07	0.86	0.08
PctFIAC	194	2.38	0.20	2.59	0.46	0.07

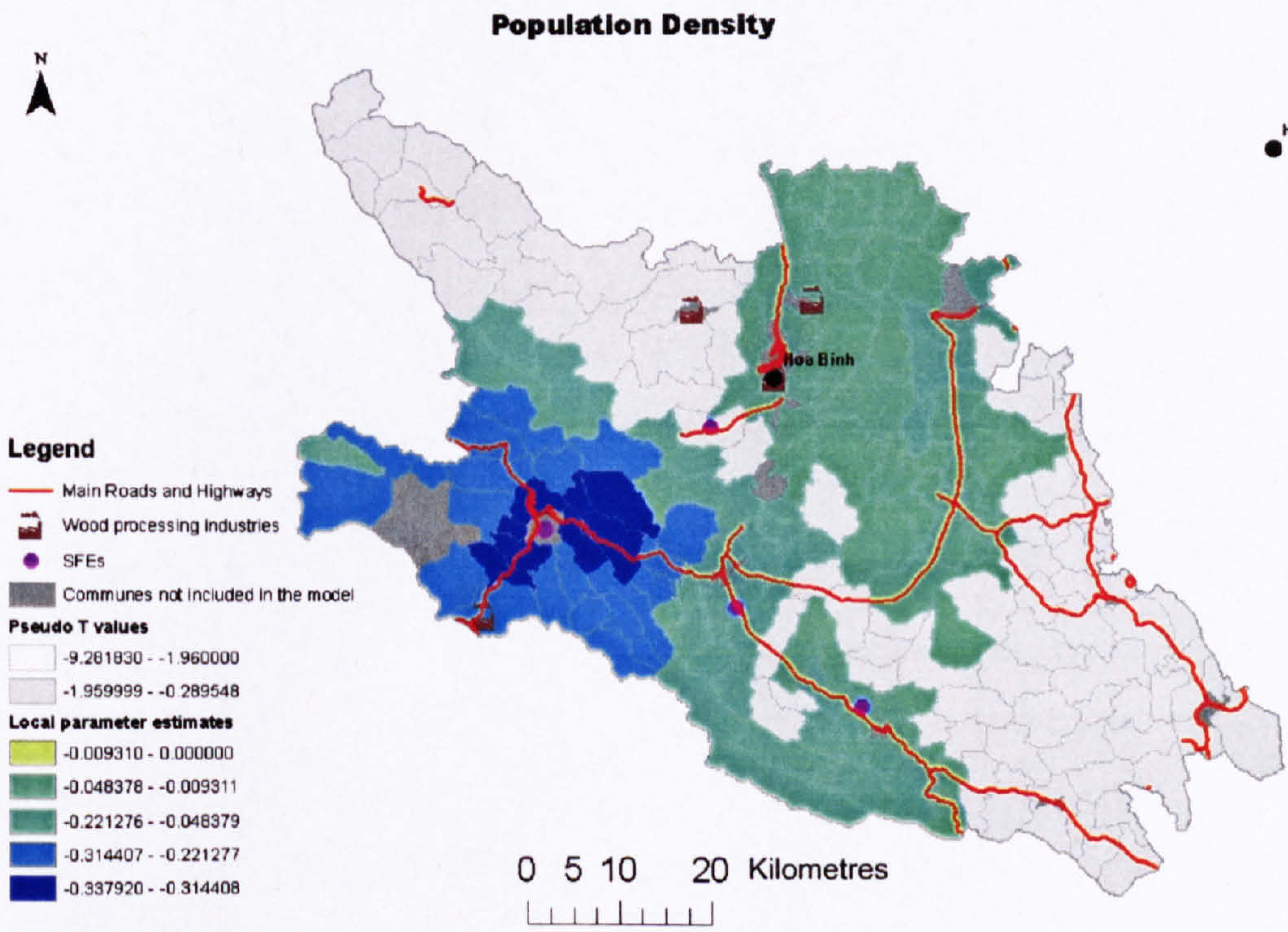
Source: this study

The range and variance of the local standard errors associated with the independent variables do not indicate the presence of multicollinearity.

V.4.5. Mapping results

Forest-cover increase and population density

In the area where forest cover increase is significantly correlated with population density (*PopDens*), the values of the local regression coefficients are negative (Map 5-7).

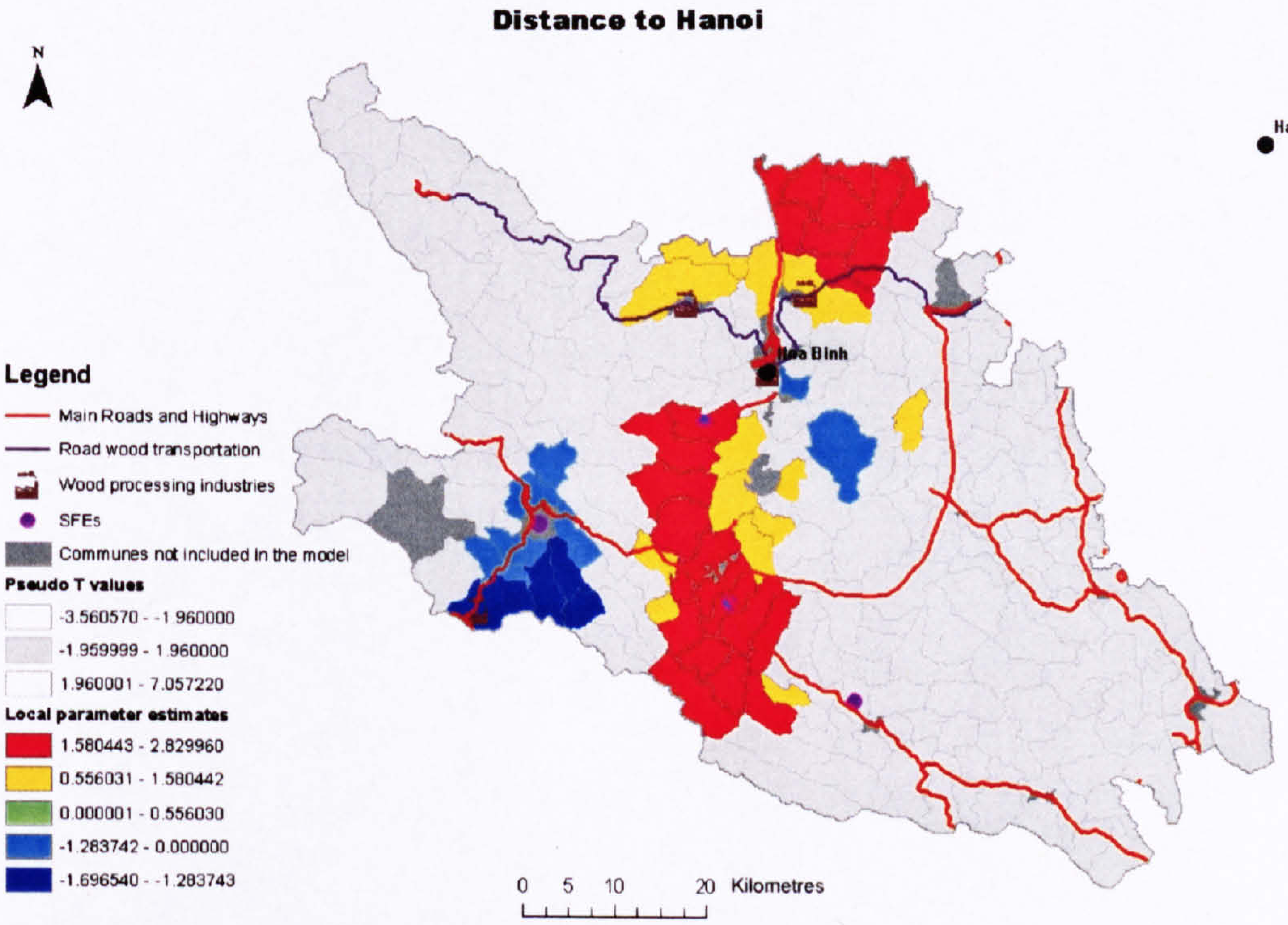


Map 5-7. Surface of local parameter estimates associated with population density (PopDens) in the best afforestation/reforestation model
Source: this study

These findings do not mean however that the results of the global and local models support the neo-Malthusian theories that link high population pressure with environmental degradation. First, the increase in forest cover observed on satellite images might be the result of the increase of tree plantations for production purposes, which is not an indicator of environmental restoration. Noteworthy, population density affected forest-cover increase mainly in areas located along the main roads and highways. It suggests that other variables related to market integration might have participated in the influence of population density on forest cover.

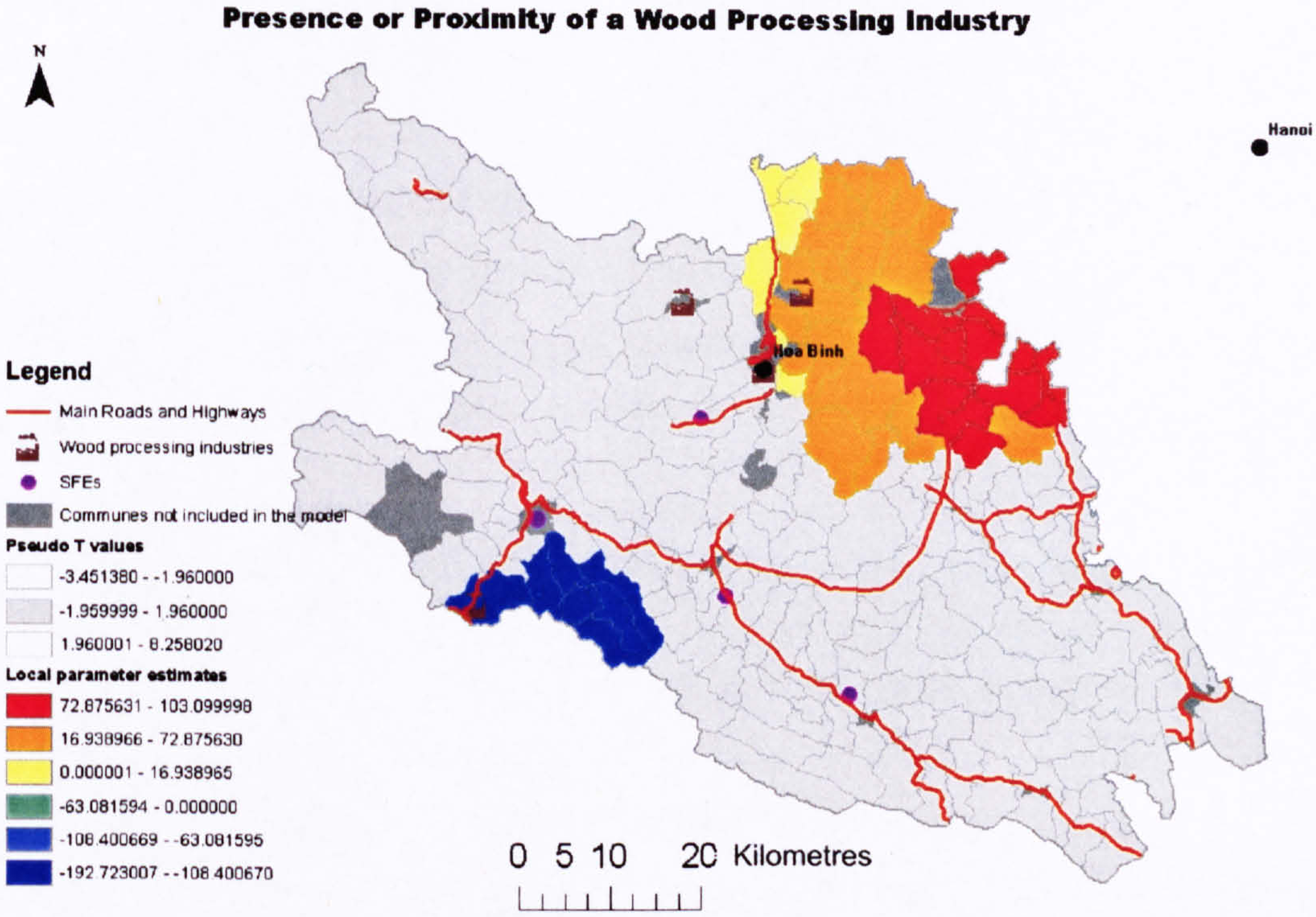
<u>Forest-cover increase and distance to Hanoi</u>

Forest-cover increase and distance to Hanoi (*DstHanoi*) are mostly positively correlated but as it was the case for deforestation, the contribution of *DstHanoi* to afforestation is very heterogeneous over the province (Map 5-8). This high spatial variation might result from the presence of local variables which have not been taken into account in the model (e.g. topography, access to roads).



Map 5-8. Surface of local parameter estimates associated with the distance to Hanoi (DstHanoi) in the best afforestation/reforestation model
Source: this study

Forest-cover increase and proximity of a wood processing industry

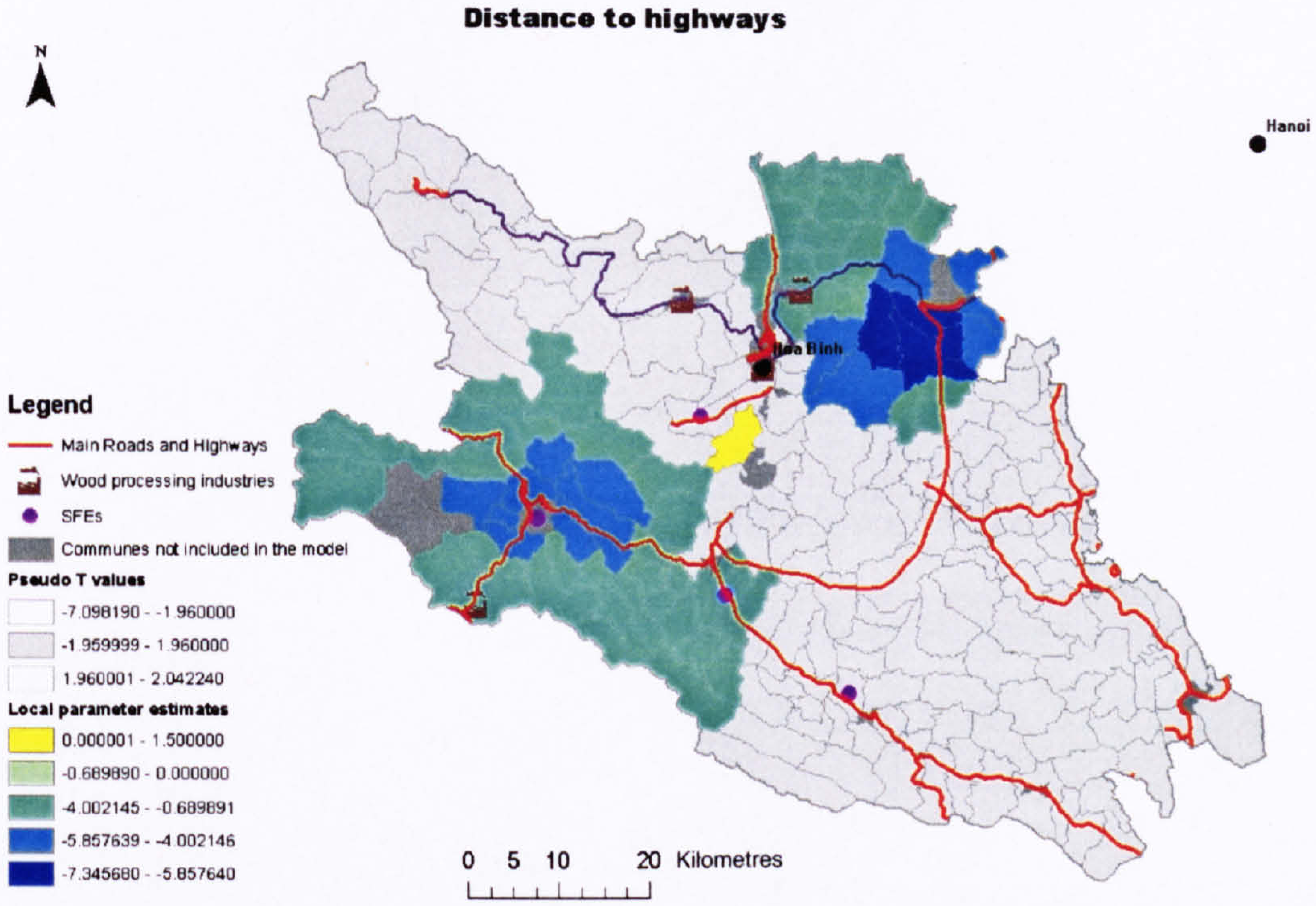


Map 5-9. Surface of local parameter estimates associated with the presence or proximity of a wood processing industry (WoodInd) in the best afforestation/reforestation model
Source: this study

There are two distinct areas where the proximity of a wood processing industry is significantly correlated with forest-cover increase (Map 5-9). In the largest area, located in the north-east part of the province, the closer to the wood processing industry, the higher the forest-cover increase. The relationship is the opposite in some communes located in the south-west of Hoa Binh Province. This opposite relationship might be related to topography: the second area is characterised by high mountains and the proximity of the wood processing industry located in this part of the province might thus significantly differ from its actual accessibility.

Forest-cover increase and distance to highways

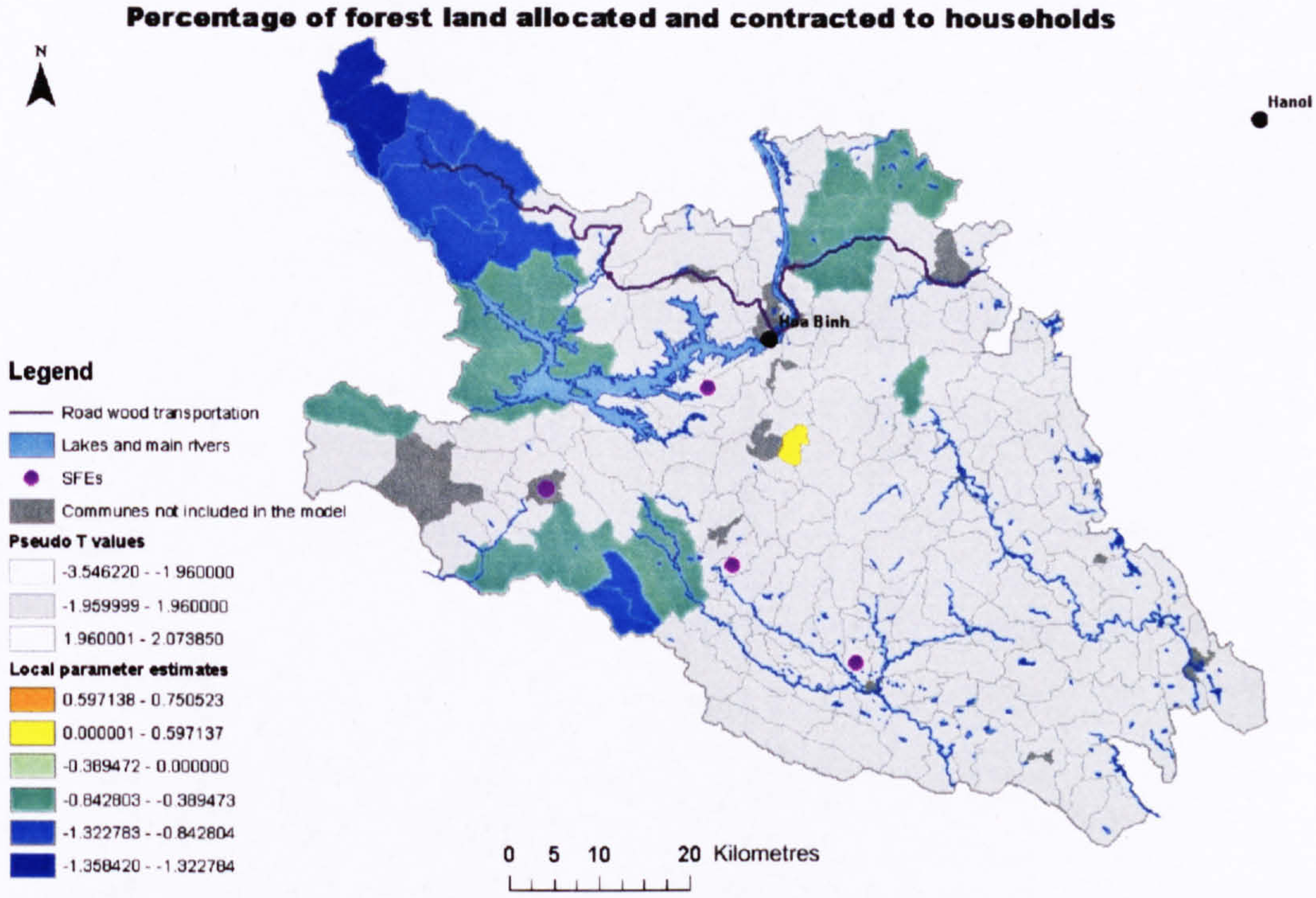
In all areas where the distance to highways is significant, the closer to the highways, the higher the forest-cover increase (Map 5-10). It might result from two distinct processes: on the one hand, more off-farm opportunities might exist in the areas closer to highways, resulting in reduced agricultural pressure on the uplands and in natural regeneration (urbanisation scenario); on the other hand, tree plantations are preferentially located in areas well-connected to markets (timber demand scenario).



Map 5-10. Surface of local parameter estimates associated with the distance to highways (DstHighw) in the best afforestation/reforestation model
Source: this study

<u>Forest-cover increase and percentage of forestry land allocated and contracted to households</u>

The characteristics of the surface of the local parameter estimates associated with the percentage of forestry land allocated and contracted are consonant with the results of the GR model (Map 5-11).



Map 5-11. Surface of local parameter estimates associated with the percentage of forestry land allocated and contracted to households (PctFlAC) in the best afforestation/reforestation model
Source: this study

In all areas where *PctFlAC* is significant, the higher the percentage of land allocated, the smaller the area of forestry land afforested. There are two indications that forest-cover increase was driven primarily by state organisations on state-owned and managed land rather than for production activities by households on their allocated land: (1) the area where the influence of the percentage of land on afforestation is the highest is located upstream Hoa Binh dam and is classified as watershed protection forestry land; (2) the variable *AreaAlCHh* (area of forestry land allocated and contracted **per household**) was not significant in the global or local models tested.

V.5. Matching of the regression findings with local observations in Tien Xuan Commune

Finally, the results of the regression analysis for Tien Xuan Commune were compared with the findings presented in **Chapter 4** and with local data. The area of forest loss and forestry land reforested from 1993 to 2000 in the commune was estimated by satellite image analysis at respectively 18 ha and 57 ha, with a total forest-cover change of +40 ha, representing an increase of 44 per cent. The area of forest cover estimated with the satellite image in 2000 is 130 ha. It is almost four times lower than the figure given by the Luong Son District Statistics Department (495 ha in 2000).

In the commune, forest-cover increase was found to be positively correlated with the distance to Hanoi, the proximity to a wood processing industry and negatively correlated with population density, the distance to highways and the percentage of forestry land allocated and contracted in the commune (Table 5-26).

Table 5-26. Variables affecting afforestation/reforestation in Tien Xuan Commune according to the results of the GWR analysis

Variable	Local parameter estimate for the commune	T-value for the commune	Correlation for the commune
Intercept	-14.72	-0.45	/
PopDens	-0.03	-2.92	Significant, <0
DstHanoi	2.06	2.03	Significant, >0
WoodInd	33.94	4.15	Significant, >0
DstHighw	-3.88	-4.19	Significant, <0
PctFlAC	-0.64	-2.04	Significant, <0

Source: this study

The correlation with population density, the percentage of forestry land allocated and the distance to highways is in accordance with the conclusions of the analysis presented in **Chapter 4**. According to the latter, the allocation of forestry land in the commune has disrupted land-use systems and reduced annual cropping areas. In turn, tree plantations have been established by farmers as the last resort option. Population density might have been an aggravating factor for this phenomenon: annual cropping was even less feasible when population density was high and the area of forestry land per capita small – or when all land was allocated to households and no communal land left. Off-farm opportunities related with the proximity to highways were found to amplify and accelerate the process of annual cropping cessation in the uplands. The positive correlation with *WoodInd* however suggests that timber demand played a role in farmers' decisions to afforest. The role of this factor had not been highlighted in the local study. Lastly, the influence of the capital city is unexpected: the distance to Hanoi is positively correlated with forest-cover increase. It might stem from the fact that the demand for timber for the capital far exceeds the supply and, even though it provides incentives for the establishment of tree plantations, results in a net deforestation.

VI. Conclusion

VI.1. Remarks on the method and its limitations

Before concluding on the previous findings, it is necessary to outline the limitations that might have affected their accuracy and reliability. These are summarised in Table 5-27.

Table 5-27. List of limitations for this study

Analytical stage affected	Description of the limitation	Type of limitation	Proposed action for further research
Calculation of forest-cover change	Ground validation points were not available for the 1993 image and available for a limited area for the 2000 image	Lack of data	Using a satellite image from a recent year* would allow the accuracy assessment to be based on ground validation for this image
Calculation of forest-cover change	The temporal scale was not fine enough to capture non-linearity in forest-cover change (e.g. process of deforestation followed by reforestation)	No high spatial resolution multispectral satellite image was available between 1993 and 1999	Change the time period considered, e.g. from 1999 to 2003*
Correlation of forest-cover change with social variables	It was necessary to assume that the social variables uniformly evolved among communes over the time period 1993-1999 and 1999-2000	Lack of data at the commune level. Limited time for data collection	Data might be available at the commune or district level; it would require more time for data collection
Correlation of forest-cover change with institutional variables	The impact of FLA might not have fully been captured in the 3-year period that was considered after the end of its implementation[44]	Time available to extend the analysis to 1999 until a more recent date	Extend the analysis from 1999 until 2003*
Correlation of forest-cover change with economic variables	Some external economic factors (e.g. the presence of industries in neighbouring provinces) were not considered	Time for data collection	Collect the necessary data
	The variables including a distance calculation did not fully represent accessibility	Lack of time and technical skills	Use a cost-weighted distance function accounting the influence of topography, road access and rivers
Regression analysis	Variables were assumed to be homogenous over the commune area	Lack of extensive data below the commune level	Conduct similar fieldwork studies in areas representative of the province in term of biophysical, social, economic and institutional variables

**An instrument malfunction which occurred in May 2003 onboard Landsat 7 ETM+ has seriously affected data acquired since this date. The satellite scenes contain alternating scan lines of missing data. Gaps can be filled by data interpolation but it is a time/money consuming process with implications for data integrity.*

[44] For instance, in Tien Xuan Commune, a majority of farmers stopped cultivating from 2000. One can suspect that in other areas of the province FLA had a limited impact on soil fertility and land management systems in the first few years that followed the allocation.

VI.2. Major lessons learnt

The analysis of forest-cover change with the remotely sensed data indicates that there was a net increase of 1 to 5 per cent in forest cover between 1993 and 2000 in the province. This is between twice and ten times less than reported in official statistics for the 1994-2000 period (see Section III in this chapter, Table 5-2). This result encourages to be extremely cautious with current government estimates of forest-cover changes and have a critical look at the extent of forest-cover increase claimed by government documents (and by the last FAO global forest resource assessments, which use government reports).

Deforestation and afforestation/reforestation exhibit distinct spatial patterns over the province, with higher deforestation concentrated in the south-east and higher afforestation/reforestation in the west. Both global and local models better explain deforestation than afforestation/reforestation. It suggests that the proximate causes for the latter are more complex than for the former. All local models considerably improved the level of determination of change in forest cover of the global models, which implies that the impact of the selected variables on both forest loss and increase was spatially heterogeneous. This spatial variability indicates that the incentives provided by state policies or meso-economic factors have a heterogeneous spatial impact on forest-cover change depending on local social or biophysical conditions.

Forest loss was primarily constrained by the distance to Hanoi (negative and positive correlation) and to roads (mostly negative correlation). It suggests that the proximate causes for deforestation were a combination of timber demand and agricultural expansion – the variables *AreaAgHh*, *WoodInd* and *PctSl35* were found to improve the global model (they were not finally selected because they did not improve the local model). None of the factors frequently mentioned by policy-makers or international organisations, i.e. population density, poverty and shifting cultivation, was identified by the global or local model as a prominent driver for deforestation. It is in accordance with the results of recent studies (Lambin *et al.*, 2001; Geist and Lambin, 2002) which have also challenged the prominence of these factors in deforestation. This finding has major implications for policy-making since all forest policies in Vietnam have been based on the premises that these factors were the actual causes for forest loss (**Chapter 7**). This is further discussed in **Chapter 8** when general lessons are drawn and policy recommendations provided.

The variables identified as main drivers for forest-cover increase are: *PopDens* (negatively correlated), *DstHanoi* (mostly positively correlated), *WoodInd* (mostly positively correlated), *DstHighw* (mostly negatively correlated) and *PctFlAC* (mostly negatively correlated). The local regression analysis indicates that two distinct processes played a role in forest-cover increase in the province. In the north-east part, the combined influence of the proximity to wood processing industries and the distance to highways indicates that in this area forest-cover increase stemmed from the establishment of tree plantations for timber demand. However, the resulting increase of forest cover was limited, as in most of this area, with the exception of a few communes, low rates of afforestation were observed. On the contrary, in the western part of the province which held high rates of forest-cover increase, afforestation/reforestation was driven by the establishment of forest by state bodies for watershed protection purposes.

GWR provided a useful method to assess the heterogeneity of the impact of meso-level factors at the provincial scale. However, the interpretation of results requires in some cases a thorough knowledge of the area and of its history. In accordance with the observations of Serneels and Lambin (2001), this descriptive spatial model highlighted some important drivers of land-use change, but its ability to assess the influence of policies is limited. The results question the positive influence of FLA on forest-cover increase – but they need to be balanced by the limitations outlined previously resulting from the relatively short time period following FLA implementation that was observed. The impact of the afforestation campaigns (mostly Programme 327 which ran until 1998) was difficult to ascertain – since the proxy used in the model (the distance to SFEs which were in charge of the campaigns implementation) might have partially captured their impact. Yet two findings challenge the role of forestry in household economic activities. Firstly, in the area where high rates of forest-cover increase were observed, findings suggest that afforestation/reforestation was the result of the establishment of forest by state bodies. Secondly, no correlation was observed between forest-cover increase and the independent variables that solely affect household land-use decisions (e.g. the area of agricultural land per household or the area of land allocated per household). The relative contribution of households and state actors was further investigated in the study that is presented in **Chapter 6**.

Chapter 6. Analysing discrepancies between policy intentions and outcomes from a regional perspective

"Production forest is also protection forest. All forests can play this role."
A senior cadre, MARD Forestry Department (formal interview, 2006)

I. Introduction

The two previous chapters have investigated decisions and outcomes taking place at the operational level, with two distinct approaches and perspectives: an ethnographic approach exploring the farmer/community perspective in **Chapter 4**, and a modelling approach with a meso-scale perspective in **Chapter 5**. The analysis now moves up to the collective-choice level, where actors choose the rules-in-use that affect the action situation at the operational level.

The local level analysis suggested that there are important discrepancies between policy intentions and final outcomes. State policies have had an impact on afforestation and on livelihoods but not in the way that was intended and planned by policy-makers. In the three villages of Tien Xuan Commune, FLA led to afforestation, but only because it disrupted the local institutions governing land management systems in the uplands to a point where annual cropping was no more viable. The state afforestation incentives favoured the establishment of tree plantations by farmers on their allocated land but only after the cessation of annual cropping. Furthermore, the contribution of the newly established tree plantations to livelihoods has been judged unsatisfactory by a large majority of farmers (except the better-off). In **Chapter 5**, the GWR analysis indicated that in most areas of Hoa Binh Province, the involvement of households in forestry activities was limited in the 1990s and that forest-cover increase mostly occurred on state-owned land. To which extent are these conclusions valid in other provinces of the NMR? What are the reasons for the gaps between policy intentions and observed outcomes? These are the major questions that are tackled in this chapter.

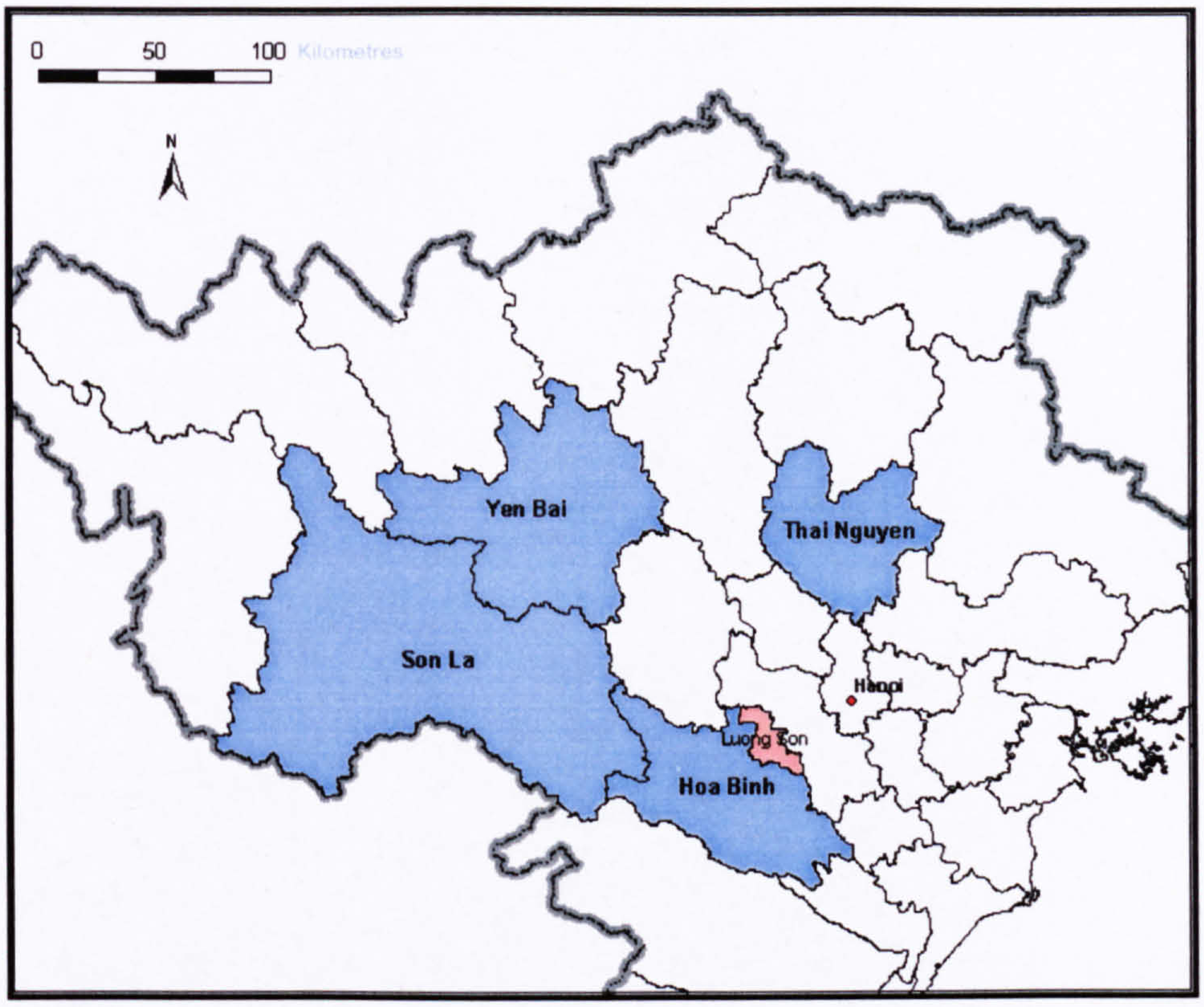
I.1. Methodology

At this stage, the analysis focuses on the following components:

1. Assess at a regional scale the most salient outcomes of the 5MHRP and FLA;
2. Explore to which extent decisions taken by provincial authorities have contributed to observed outcomes; and
3. Identify the major drivers for these decisions.

The first component has relied on triangulation, based on household-, commune-, province- and region-level data: (1) interviews with farmers, provincial bureaucrats, development practitioners and policy-makers, (2) literature review of scientific studies and reports from provincial administration and (3) results of the GWR analysis presented in **Chapter 5**. Interviews with provincial state administration and central policy-makers (see further in this section for more details) have provided the primary data for the two other components. The discussion in this chapter is frequently illustrated by original quotations taken from these interviews.

Semi-structured interviews with civil servants of provincial bureaucrats have taken place in four northern provinces: Hoa Binh, Son La, Thai Nguyen and Yen Bai (Map 6-1). The provinces were selected according to fieldwork feasibility but also in order to constitute a representative sample of the NMR regarding socio-economic (distance to Hanoi, population density, importance of the forestry sector), environmental (area of land classified as forestry land), and political (progress in FLA implementation) variables. These characteristics are presented in Table 6-1 for each province. This is not an extensive list of all significant variables and data aggregated at the provincial level hide large inter-district variability, but they give to the reader not familiar with the northern region of Vietnam a grasp of the socio-economic, environmental and political context in the four provinces.



Map 6-1. Location of fieldwork for the analysis of the decisions of provincial state administration Fieldwork was conducted in the state administrations of the four provinces coloured in blue on the map and of Luong Son District (Hoa Binh Province) in pink on the map

Table 6-1. Characteristics of the visited provinces (2006 figures)

Provinces	**Hoa Binh**	**Son La**	**Thai Nguyen**	**Yen Bai**
Total area* (km^2)	4662.5	14055.0	3543.5	6887.8
Population density† (person/km^2)	174.0	70.0	313.0	106.0
Distance from the provincial capital to Hanoi (km)	76.0	308.0	80.0	183.0
Forest cover* (%)	44.2	41.1	46.5	54.7
Percentage of land classified as forestry land* (%)	69.9	65.6	50.0	76.7
Output value of forestry at constant 1994 prices† (billion VND)	193.6	231.1	67.5	332.7
Percentage of forestry land allocated‡ (%)	92.9	99.8	82.3	99.5
Percentage of forestry land allocated to communities, villages and Commune People's Committees‡ (%)	11.5	49.1	4.2	24.7
Percentage of of forestry land allocated or contracted to households‡ (%)	74.9	17.5	47.0	62.0

Sources:

* *FPD website, (only available in Vietnamese), http://www.kiemlam.org.vn/Desktop.aspx/News/So-lieu-dien-bien-rung-hang-nam/Nam_2006, last accessed in March 2008*

† *GSO of Vietnam website, http://www.gso.gov.vn, last accessed in Feb 2007*

‡ *2006 reports on land allocation from the FPD of the visited provinces*

Visits consisted of two-hour semi-structured interviews with senior officials from the DARD, its Forestry sub-Department and the FPD in the four provinces, the DONRE in two provinces and the Forest Science Institute of Vietnam (FSIV) in Son La. In total, 12 organisations and 21 persons were interviewed (see list in **Annex L**). The interviews explored the implementation of the 5MHRP, the FLA process, the perceptions of land degradation, forest and land management and the characteristics of the forestry sector in each province (**Annex M**). In addition, provincial reports on the evaluation of the 5MHRP and FLA prepared by the DARD and FPD for the central governments were collected during the visits. The role of other potential influential actors such as donors and NGOs is not developed in this chapter, which focuses on the action and decision of the provincial state organisations that act as policy implementers; the influence of international organisations on policy outcomes was investigated in the central policy-making arena (**Chapter 7**).

At the central level, 36 semi-structured interviews of one hour were conducted with policy-makers including: foreign and national researchers, donors, international and national NGOs, consultants and civil servants (**Annex N**). These interviews were primarily done for the analysis of policy-making arena at the central level (**Chapter 7**) but national discourses related to forest and land degradation were examined for the analysis of the decisions of provincial state administration.

I.2. Characteristics of the action arena at the collective-choice and provincial level

Figure 6-1 presents the analytical unit considered in this chapter.

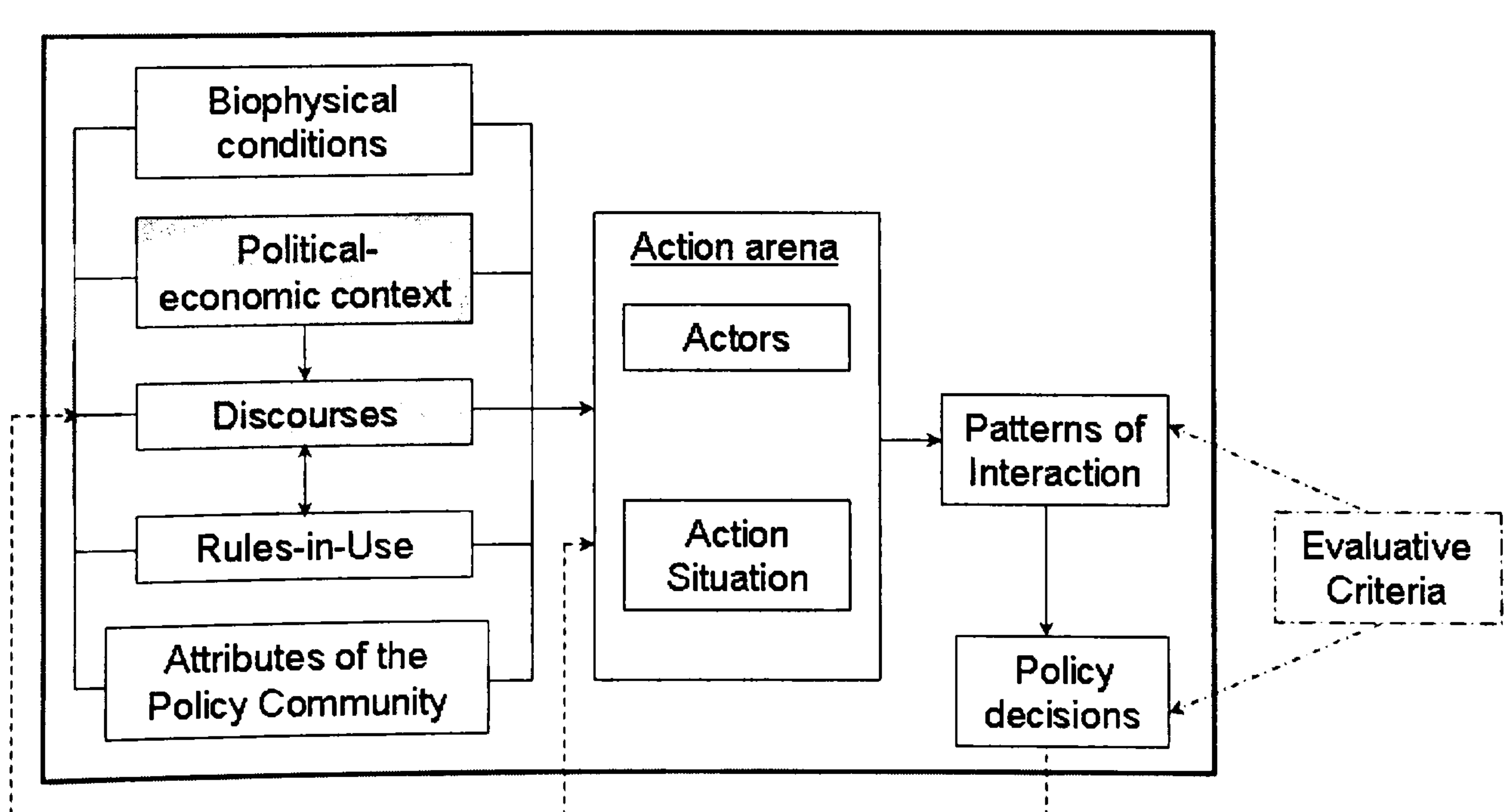


Figure 6-1. Analytical framework for policy-making analysis at the provincial level

It is essential to consider the characteristics of the action arena as they affect the way external variables influence outcomes. In the unit of analysis considered, policy decisions are seen as public goods. It implies that policy design is affected by the problems affecting the production and management of public goods, e.g. rent seeking and free riding (Gibson *et al.*, 2005). In their analysis of development aid, Gibson *et al.* (2005) point out two major categories of social dilemmas commonly encountered in the provision of public goods in collective-choice situations: the motivational problems and the informational problems.

Motivational problems relate to actors' incentives to take specific decisions or to follow specific actions. Rent-seeking and corruption are some of the most common motivational problems that arise at the collective-choice level. Rent-seeking occurs when individuals taking part in collective choices have an incentive to propose rules that give advantages to them or to individuals or organisations that have power over them. In these situations, a system of patronage based on corruption might develop. It then becomes extremely difficult to challenge it and design new fair rules that do not reinforce the privileges of the existing elite (Gibson *et al.*, 2005).

The administration in Vietnam follows a very hierarchised structure where principal-agent relationships prevail (Wescott, 2003). In such a situation, "the principal is an individual (or the representative for an organised set of individuals) who benefits from the outcomes achieved by the agent, while the agent is offered the contract to take the appropriate actions to achieve the outcomes" (Gibson *et al.*, 2005, p. 43). Sikor (2004) argues that the discrepancies observed in the implementation of FLA between state policies and provincial actions are not so much rooted in a lack of control and enforcement but in the existence of cleavages between the central government and provinces. Such cleavages were in evidence regarding the 5MHRP during interviews: several officers in charge of its implementation depicted the programme as a top-down initiative that has had little benefit on poverty reduction and economic growth. Thai Nguyen Province has developed its own afforestation scheme in parallel to the 5MHRP because provincial policy-makers considered that the 5MHRP had a poor capacity to foster smallholder tree plantations and improve livelihoods. Provinces have also rather limited means to implement policies which are in certain cases contradictory (e.g. several policies concomitant to the 5MHRP encourage cash crop cultivation and husbandry development). Some provincial departments were critical of the recent requirements of the State on the implementation of FLA because the central government does not provide sufficient means to achieve them (source: interviews).

In addition, corruption is a widespread problem in Vietnam (**Chapter 3**). Of course it was not mentioned during interviews with provincial departments, but it was reported by a few farmers, notably for the process of land allocation to households, and directly experienced several times in the conduction of fieldwork. Apart from these insights collected at the village level, it was difficult, given the sensitivity of the topic, to gather sufficient information to report on the extent or precise mechanisms of corruption at the provincial level.

Informational problems stem from missing or asymmetric information. These are common problems under principal-agent situations (Gibson *et al.*, 2005): when the agent has different preferences than the principal, the former might deliberately hide information to the latter in order to pursue its own objectives. It was thus suspected that such problems arise in the context of forest policies in Vietnam.

II. The 5MHRP: afforesting for whom and for what?

II.1. Prominent outcomes

II.1.1. Smallholder forestry

The wood processing industry in Vietnam is undergoing a dynamic expansion and there is a strong national demand for timber, as needs are still largely covered by imports (Barney, 2005). However, there are several difficulties in strengthening the role of timber production in the national economy and as a financially viable option for farmers[45], which were highlighted during interviews and in several studies (Fortech, 1998; Roda and Rathi, 2005).

Most provincial cadres acknowledged during the interviews that current market conditions for timber were not attractive and that forestry was not an appealing option for most farmers because it required long-term investments. As stated by senior

---

[45] Difficulties mentioned are the low productivity of plantations and the high transportation costs related to tree plantation scattering and low accessibility.

officials from the DARD in one visited province: "*When someone wants to invest, this person has to calculate the return of the forestry option and it is less attractive than other options*"[46] (formal interview, 2006). Even in the Bai Bang paper mill supply area, Ohlsson *et al.* (2005) report that farmers' agricultural needs were still stronger than the incentives provided by the mill's demand for timber. In Tien Xuan commune, despite relatively favourable timber marketing conditions, tree plantations were chosen as the last resort, once other land-use options were not profitable.

Although the second stated goal of the 5MHRP is poverty reduction, this programme has actually provided few incentives to make forestry an attractive option for farmers and improve farmers' incomes (Dinh Duc Thuan, 2005). Surprisingly, the 5MHRP investment funds have indeed been almost exclusively directed at protection forest where establishment and exploitation have to follow strict state planning schemes and regulations. Loans for production forest are *de facto* difficult to access for most farmers (MARD and 5MHRP Secretariat, 2001) and their interest rate is too high to provide sufficient economic incentives (DARD Thai Nguyen, 2006). The poor capacity of the 5MHRP to foster smallholder tree plantations and improve livelihoods has been openly recognised by the authorities of Thai Nguyen Province, who have decided to develop their own afforestation scheme, specifically directed at households, in parallel to the 5MHRP.

II.1.2. Forestry land classification

Although forestry land classification is not a recent policy decision, its implementation is still on-going in the NMR. The 5MHRP is intimately linked with forest and land classification: the programme requires that a plan for land-use shall be established for open land and bare hills and that newly established forests shall be equally balanced between special-use, protection and production forests (Prime Minister of the Government of Vietnam, 1998). According to interviews with provincial officers, the area of land classified as protection forestry land has greatly increased for the last decade, under the implementation of Programme 327 and then under the 5MHRP. This has been confirmed by national figures (Table 6-2) and official statements (Deputy Prime Minister of the Government of Vietnam, 2005). The area of protection forestry land reported by local authorities to the MARD reached over 9

---

[46] This is specific to the northern uplands and does not apply to all mountainous regions in Vietnam. In the central highlands, tree plantations have enjoyed more success because of different market conditions.

million ha in 2005, far beyond the 6 million ha that had been planned by the GoV in the National Forestry Development Strategy 2001-2010.

Table 6-2. Evolution of the land area classified under the three categories of forestry land

Type of forestry land	Area in million ha in 1999[a]	Area in million ha in 2005[b]
Special-use forestry land	0.9	2.4
Protection forestry land	5.7	9.5
Production forestry land	12.4	7.1
Total forestry land	19.0	19.0

Sources:
a. Nguyen Xuan Nguyen et al., 1999
b. FPD, 2007 on www.kiemlam.org.vn

The increase of protection forestry land has several important social and economic implications. On the one hand, it decreases the area of land available for crop cultivation, grazing or, if forested, timber exploitation (Dinh Duc Thuan, 2005). On the other hand, it increases the area under state control. The conjunction of both factors (decreased land area for economic production and inadequate means of control) has favoured corruption and activities (e.g. logging and wood marketing) now considered illegal (McElwee, 2004; To Xuan Phuc and Sikor, 2006). In this context, the rules of the most powerful dominate. Villagers involved in illegal activities do not make high profits compared to middlemen or corrupt officials involved in large-scale logging such as SFEs (McElwee, 2004). In the illegal timber commodity chain, the highest risks and the lowest incomes are borne by the less powerful actors of the chain, i.e. small-scale illegal loggers (To Xuan Phuc and Sikor, 2006).

II.2. Linking outcomes with external variables

The previous section reviewed the major outcomes of the 5MHRP. This section discusses to which extent these outcomes result from decisions taken by provincial authorities. It analyses how the external variables such as the political-economic context, institutions and discourses have affected the incentives and beliefs of provincial bureaucrats.

II.2.1. Political-economic context

One might find surprising that, although the objectives for new plantations defined in the 5MHRP entail 60 per cent for production/industrial forest, the budget of 5MHRP has a marked focus on protection forest (Prime Minister of the Government of

Vietnam, 1998). In the context of a strong government commitment to economic development and an increasing need for timber, one would expect the state support to be devoted to develop forestry. Results indicate that the State has actually supported the forestry sector under the 5MHRP. However, it has not been achieved by fostering household economy, but by helping SFEs to survive.

During fieldwork in Hoa Binh Province, an officer of the Luong Son District FPD unit reported that, "*in 2004, the government decided to extend some of the protection forestry land to protect water springs*" (formal interview, 2006). But doubts can be raised about the extent to which environmental concern has driven the increase of protection forestry land. Beyond environmentally oriented discourses lies a range of political and economic interests. Part of the 5MHRP state funding goes to SFEs to cover the programme administration costs. Many SFEs, which are now supposed to run as independent businesses, lack capital (EASRD, 2005) and rely on the 5MHRP funds to survive (source: interviews). A MARD cadre acknowledged that under Programme 327, "*provinces increased protection forestry land to benefit from state budget*" (formal interview, 2006). According to interviewed donors and NGOs, the same reason prevailed under the 5MHRP: provinces have increased the protection forestry land area to receive more state funds (Nguyen Xuan Nguyen *et al.*, 1999; MARD and 5MHRP Secretariat, 2001; De Jong *et al.*, 2006a). It was also officially acknowledged by the Deputy Prime Minister at a review workshop on the 5MHRP held in Hanoi (2005).

The fact that a MARD official recognised that, under Programme 327, provinces had increased protection forestry land area to receive state funds suggests that the central government was already aware of this bias by the time the 5MHRP was designed. However, by allocating all funds to protection forest, the central government unambiguously encouraged the same process under the 5MHRP. There are indeed several strong political and economic interests at the central level which suggest that it was a deliberate decision. First, the increase of protection forestry land enables the State to keep control of forestry activities and forestry land under state-linked organisations. Second, it is in the interest of central and provincial authorities to help SFEs to survive. SFEs form an important employer in several provinces and still retain large areas of forestry land. Furthermore, there is a tight relationship between the forestry sector and the policy arena at the provincial and central level. Forestry was a substantial source of revenues for the Communist Party in the Southern and Central provinces of Vietnam (Bangkok Post 1993 in McElwee, 2004). Because many senior provincial and central cadres of the Party-State come from the forestry sector, foresters are still powerful in the policy arena. Predominant drivers for the increase in protection forestry land area lie in the politico-economic context. Nevertheless, the politico-economic context has played an important role precisely because the rules-in-use designed at the central level have provided further incentives for provincial actors to pursue their interests.

II.2.2. Rules-in-use

Centrally designed rules have encouraged the bias in forestry land classification and state funds diversion in several ways. Firstly, the rules on land classification lack clarity and consistency (Sowerwine, 2004; Ohlsson *et al.*, 2005). The classification under the three categories remains controversial (MARD, 2000; MARD and 5MHRP Secretariat, 2001), and the criteria for land classification and the boundaries between protection and production forest are unclear. This lack of clarity was reinforced by the fact that definitions have greatly changed over the past 10 years. Secondly, SFEs are by law autonomous business units but they have been nonetheless also entitled by the same law (Decree 200/2004/ND-CP) to keep up to 5000 ha of protection forest, which induces the possibility of mixing public service and private business activities and being eligible to receive state subsidies. Lastly, there has been a lack of monitoring on the 5MHRP implementation by the central level. The recent state audit on the 5MHRP reported malversations of civil servants and state organisations resulting in a misappropriation of the programme investment funds amounting to 135 billion VND[47] (Cong An Nhan Dan (*Công An Nhân Dân) (*People's Police) newspaper, 2007).

II.2.3. Discourses

Blurred discourses have also facilitated the arbitrary implementation of blurred rules on forest classification. There is some "fuzziness" in official communications around what is the major focus of the 5MHRP. For instance, although the first stated goal in Decision 661 is environmental protection, a study recently published by the MARD says: "compared with the previous 327 program which mainly focused on protection forest, the 661 project considered timber production from plantations as the major strategy of the reforestation" (Dinh Duc Thuan, 2005). In public discourses, the environmental function of production forest comes first, prior to production objectives:

[47] This is equivalent to approximately 6.6 million Euros / 8.7 million USD.

"Plantation of the production forest is to contribute to the environmental and ecological protection while increasing incomes of those relying on forestry activities" (Prime Minister of the Government of Vietnam, 2007a).

What is more, the difference between the characteristics of protection and production forest is not clear, as illustrated by this quote from a senior official from the Forestry Department of the MARD: "*Production forest is also protection forest. All forests can play this role*" (formal interview, 2006). Interestingly, the opposite, i.e. the fact that protection forest can fulfil productive purposes is far less clear in discourses. But a close scrutiny on Decision 661 indicates that the characteristics defined for protection forest do not necessarily meet requirements for the provision of environmental services. In Decision 661, technical guidelines for watershed protection forests specify: "in the areas where the conditions so permit, the use of species with high economic value should be encouraged" (Prime Minister of the Government of Vietnam, 1998, Article 4). Most planted tree species under the 5MHRP are indeed fast-growing trees adapted to the needs of the pulp and paper industry, of which actual contribution to watershed protection is questionable. In one province, a cadre from the Forestry Department explained:

> Before 2003, we were planting *Chukrasia Tabularis* and teak (*Tectona grandis*). Since 2004, we have replaced them by acacia, pine and eucalyptus for economic reasons. For *Chukrasia tabularis*, we need to wait for 30-50 years to exploit, for pine it is only 15 years. After the 15th year, pine trees give resin and wood for pulp.

It would be simplistic and only partly true to conclude that central policy-makers have purposely mixed environmental and economic goals in their discourses to pursue vested interests. Genuine environmental concerns have also guided the formulation of forest policies in Vietnam. But forest is imagined and depicted by policy-makers as an environmental panacea, a universal remedy against landslides, floods and water shortages. As outlined in **Chapter 1**, although forests do provide environmental benefits, some links between forests and hydrology have been exaggerated and highly depend on sites and tree species (e.g. Calder, 1998; Bruijnzeel *et al.*, 2005). However, oversimplified narratives on forests and floods or forests and water flows are still vivid on the international scene and in Vietnam (e.g. MARD and 5MHRP Secretariat, 2001, p. 4). In Vietnam, afforestation efforts have aimed at establishing a "green cover"[48], regardless of tree species and forest quality (**Chapter 7**). The need for re-greening

[48] The goal of covering the land is explicit in the name of the Program 327: "Greening the barren hills".

what are called barren hills still holds, as demonstrated by this quote from a senior staff of a Vietnamese research institute commenting forest increase in Vietnam: "*The quality of forest is poor but it is very green*" (formal interview, 2006). The first objectives of the 5MHRP recently re-stated by the Deputy Prime Minister in a workshop were "speed up forest plantation; re-green bare land" (Deputy Prime Minister of the Government of Vietnam, 2005). At the provincial level, the same narrative also prevails, as illustrated by this quote from a senior cadre of the sub-Department of Forestry: of one visited province "*from 2004, we have planted acacias, pines and eucalyptus saplings; with these, it is very easy to cover the land*" (formal interview, 2006).

III. Has FLA led to improved land management?

III.1. Prominent outcomes

III.1.1. Impact on land management

Before FLA, people in the NMR usually practised various forms of shifting cultivation, including nomadic cultivation. For central policy-makers, FLA aimed at fixing cultivation, encouraging swiddeners to adopt "more-sustainable" (or more-intensive) land-use practices, and thereby halting deforestation. As intended, FLA, combined with settlement policies, has greatly hindered shifting cultivation systems. Once land was allocated, it was not possible to open up new fields and the small size of individual plots did not usually enable crop fallowing. But the move to fixed cultivation and individual property also caused a range of unintended consequences.

Rotational shifting cultivation has proved to be well-adapted to the biophysical conditions of mountainous regions (Sharma and Kerkhoff, 2006). In many areas, scholars have observed that the move from shifting to fixed cultivation has accelerated nutrient depletion (Mellac, 2000; Nguyen Thanh Lam *et al.*, 2004; Castella *et al.*, 2006; Jakobsen *et al.*, 2007). In Tien Xuan Commune, the allocation of uplands to households was also found to have disrupted collective land-use systems, ultimately forcing all farmers to stop annual cropping (**Chapter 4**). Other scholars (Gomiero *et al.*, 2000; Hager, 2006) have reported conflicts over NTFPs and grazing land resulting from or exacerbated by the lack of common land induced by allocation to individuals and households. Some provincial department staff recognised during interviews the difficulty to match private property system with existing land-use arrangements.

"*Ethnic minorities live in a disparate way; it is difficult to allocate land to one household or to another*" (an officer, DONRE, formal interview, 2006). Although in some instances, FLA to households might have had positive effects, the individual property regime has led in many instances to unintended negative outcomes because it does not fit with the local biophysical conditions and cultural characteristics of the region (Do Dinh Sam, 1994; Castella *et al.*, 2002; Dupar and Badenoch, 2002).

The recent legal recognition of community forestry in the revision of the Land Law (2003) and the Forest Law (2004) reflects a remarkable shift in the institutional framework for forest and land management. However, according to interviewed consultants and donors in Hanoi involved in forestry at the central level, few provinces have put this legal decision into practice. Visited provinces exhibit disparities in their implementation of and interests in Community-Based Natural Resource Management (CBNRM). No land has been allocated to communities in Yen Bai Province because "*nobody has asked for it*" (an officer, DONRE, formal interview, 2006). In Thai Nguyen Province, the land allocated to villages is remote land for which no household was willing to receive land certificates. In Hoa Binh Province, authorities are considering implementing community forestry because they estimate that CBNRM could be more cost-effective than individual forestry. Son La Province was an exception in its early allocation of forestry land to communities in 1994-1996[49]. It has presently allocated a relatively high proportion of forestry land to communities compared with other visited provinces (Table 6-1, Section I.1). However these figures do not necessarily represent the actual devolution of forest and land management to local population. "Community" has often actually meant the Commune People's Committee as reported by interviewed development practitioners and suggested by this comment of a senior cadre of Son La FPD: "*We allocated land to communities because we did not have time to create a management committee to allocate to groups of households, but it will change*" (formal interview, 2006). The underlying rationales and incentives which have influenced the provinces' decisions to support community forestry are explored in section III.2.

III.1.2. Impact on afforestation

There has not been any comprehensive national study assessing the impact of FLA on forest cover so far. However, several corroborating pieces of evidence suggest that

[49] FLA to communities was however limited to seven communes of Yen Chau District.

FLA has had little impact on household's decision to plant trees or to expand cultivated upland area. First, it gathered a large consensus among the provincial officials interviewed, e.g.: "*Allocation didn't have an impact on land use. Land use depends on soil quality and household objectives (...). With a high demand for agricultural products, instead of planting protection forest, they will cultivate agricultural crops*" (an officer, DONRE, formal interview, 2006), or expressed in a more subtle way: "*Allocation has had an impact on land use, but we cannot precise, changes are not very important*" (an officer, FPD, formal interview, 2006). It is particularly striking in Son La Province where maize cultivation still dominates the upland landscape. Several studies at the local level found that natural forest regeneration occurred after FLA (Sikor, 2001; Castella *et al.*, 2006), but suggested that it was the result of agricultural intensification in the lowlands and the subsequent reduced agricultural pressure on the uplands (Meyfroidt and Lambin, 2008) rather than the effect of secure land tenure rights. The best-fit regression model designed to explain forest-cover change in Hoa Binh Province (**Chapter 5**) suggests that, in most areas, the percentage of forestry land allocated and contracted did not affect or had a negative impact on forest-cover increase during the three first years following its implementation[50]. The positive correlation between FLA and the increase of forest cover in Vietnam has been challenged by many studies[51] (Sikor, 2001; Dinh Duc Thuan, 2005; Sunderlin and Huynh Thu Ba, 2005).

III.2. Linking outcomes with external variables

III.2.1. FLA and land management

According to the analysis led in Tien Xuan Commune and previous studies (Mellac, 2000; Nguyen Thanh Lam *et al.*, 2004; Castella *et al.*, 2006; Jakobsen *et al.*, 2007), the unintended outcomes of FLA to households on land management are mainly rooted in its poor adequacy with prominent biophysical characteristics of the northern uplands (e.g. large remote areas, low fertility) and its incompatibility with land-use systems managed under collective rules-in-use (Gomiero *et al.*, 2000; Hager, 2006). Discrepancies regarding land management thus mainly reside in the inadequacy of

---

[50] The model captured the impact of FLA from 1994-1997 to 2000.

[51] Contrary to this assertion, the socio-economic assessment report of Bai Bang paper mill, commanded by the Swedish International Development cooperation Agency (SIDA), argues that FLA has provided strong incentives to farmers of the Bai Bang mill neighbouring areas to engage in forestry. It recognises however that reforestation would not have sustained without the unique commercial opportunities offered by the proximity of the mill (Blower *et al.*, 1999, p.158).

centrally designed policies to upland biophysical conditions and community rules rather than in policy implementation, and is discussed in **Chapter 7**. I instead examined the implementation of CBFM, recently encouraged by the central government through the recognition of communities as legal recipients of property rights in the 2003 Land Law and 2004 Forest Law.

Son La Province has often been regarded as an avant-garde province with regard to CBNRM as it was far ahead the recent decisions of the central government when allocating land certificates to villages in 1994-1996. Although it is difficult to ascertain which factors drove this decision of Son La People's Committee, the main interests and incentives that might have pushed it forward can nonetheless be identified. According to Sikor (2004), there was, in the mid 1990s, a real concern among Son La Province's authorities in deforestation and more specifically in the related risks of sedimentation in the reservoir feeding the hydro-electric dam of Hoa Binh[52], located downstream. According to a senior cadre of Son La FPD, FLA was indeed the rational solution to deforestation: "*Before, forests didn't have owners, it was a public good that belonged to the state. Thus people destroyed it. This is why we decided to allocate forest and forestry land*" (formal interview, 2006). In his view, the choice of allocating land to "communities" rather than to households was also justified by the following arguments: "*if we devolve property rights to the community, its awareness is raised. Forest is a public good so an individual does not damage it. Furthermore, villages have rules-in-use to protect the forest*" (formal interview, 2006). Finally, from 2000 the German development agency *Gesellschaft für Technische Zusammenarbeit* (GTZ) played a great role in expanding and further developing the "experiment" initiated by the Province People's Committee with the Song Da River Project[53].

Behind these rational arguments lie also bureaucratic and economic interests. For provincial authorities, land allocation to local communities eases the overwhelming and costly process of allocating land parcels to individual households. As explained by a senior officer of the FPD in one visited province: "*it is easier to allocate land to communities. We only discuss with the head of the village, no need to discuss with all*

[52] Some sources claim that the life expectancy of the dam could be reduced from an estimated range of 100-300 years to 50 years because of a high sedimentation rate in the reservoir (Poffenberger and Nguyen, 1998).
[53] This project ran from 1990 to 2004 and led to the experimentation of pilot community forestry schemes in 3000 villages of Son La Province.

villagers" (formal interview, 2006). Bureaucratic or economic reasons are not less valuable than ideological ones, but they are likely to lead to distinct outcomes as objectives of administrative efficiency or reduction in state budget expenses become prominent over sustainable NRM and livelihood improvement. For instances, when the rationale for CBNRM is based on administrative factors, no matter whether land-property rights are actually devolved to groups of households or transferred to the Commune People's Committee.

As in the case of the 5MHRP, the ability of the provincial administration to pursue their interests has been allowed and facilitated by centrally designed rules. Firstly, the revised Forest Law is unclear on the legal rights of communities. Although it includes a section on forest allocation to village communities, communities are not recognised as legal forest owners (Articles 3 and 5 in National Assembly of Vietnam, 2004). Secondly, the allocation of forest and land to communities is not really encouraged: it is recommended either when forest is already managed or used "efficiently" by the community or when forest "cannot be assigned to organisations, households or individuals" (Article 29 in National Assembly of Vietnam, 2004). It tacitly suggests that the allocation of forest to households is preferable to the allocation to communities.

Discourse analysis confirms that the benefits and pertinence of CBFM is actually unclear in the policy-making arena. Most respondents at the provincial and central level depicted CBFM as "good" – generally meaning "fostering or enabling forest protection". However, interviews indicate that this belief rather comes from the conformance to politically correct discourse than to a genuine conviction. No respondents specified why or under which conditions community forestry might be suitable. There was also often in the discussion a general confusion between open-access and common-property regimes. For instance, shortly after asserting that community forestry was "good", a forestry expert working for a cooperation agency stated: "*Before land allocation, forest was owned by many people at the same time, and thus was destroyed*" (formal interview, 2006), thereby sustaining Hardin's view of the Tragedy of the Commons (Hardin, 1968). Lastly, the rationale for CBNRM most often quoted by respondents is that CBNRM is a "traditional way of land management". However, the traditional character of a practice *per se* does not guarantee sustainability, equity or efficiency.

As suggested previously, CBNRM certainly holds many assets which suit particular conditions of the uplands. But its use as a black-box concept is problematic. First, because the suitability of CBNRM for forest protection requires an examination of local institutions, culture and biophysical conditions (Thomson and Schoonmaker Freudenberger, 1997; Gibson *et al.*, 2000b). Second, because a clear argumentation on CBNRM benefits is necessary to change the beliefs on the ability of ethnic minority groups to manage forest and land which still prevail among provincial bureaucrats.

III.2.2. FLA impact on afforestation

In addition to results of several studies (Dinh Duc Thuan, 2005; Ohlsson *et al.*, 2005), interviews with provincial public servants have stressed the difficulty for farmers in making a living from forestry under the current market conditions. In the absence of well-developed markets for timber, secure land tenure rights alone have not been sufficient to encourage afforestation or stop illegal logging. Furthermore, law enforcement related to individual property regime is often difficult regarding the uplands of the NMR. The unsuitableness of financial and human resources with upland areas for policy implementation and enforcement was recognised by all visited provincial departments and was expressed in the provincial reports of the provinces on the evaluation of FLA and the 5MHRP.

Central policy-makers might not have had fully acknowledged the constraints affecting FLA. Forestry land makes up as much as 80 per cent of the territory in the visited provinces (Table 6-1, Section I.1), and are often located in remote areas with low accessibility, which directly affects monitoring and control efforts, and increases information and communication costs. Moreover, interviews stressed the current difficulty to make accurate maps, which in turn hinders not only FLA implementation and forest-cover assessment, but also control and enforcement.

Adding to this, rugged working conditions reduce the motivation of public servants to perform their tasks dutifully. Along with low salary, it has resulted in little enthusiasm for what has been felt by provincial state agents to be a top-down programme with uncertain benefits. What is more, commune authorities are *de facto* often more accountable to local people than to district or provincial authorities because of strong kinship ties (Sikor, 2001; Dupar and Badenoch, 2002).

The recent increase of land area classified as protection forestry land has augmented the area officially under state control, accentuating the inadequacy of state means for control and enforcement. But this is not an issue of concern for the DARD and the Forestry sub-Department, which implement the 5MHRP and receive state funds, since forest protection is under the responsibility of the FPD. The implementation of the 5HMRP and forest protection is led by two departments that have no incentive to collaborate.

IV. Conclusion

There are a number of findings presented in **Chapters 4 and 5** which have been asserted by a wide range of respondents including provincial senior bureaucrats, development practitioners and policy-makers. Triangulation of these multiple sources of evidence has allowed to point out the most salient outcomes of the 5MHRP and FLA on land management and land use at a regional scale:

1. The 5MHRP has not successfully involved households in forestry;
2. The implementation of the 5MHRP has encouraged a bias in forestry land classification – namely an over-classification into the protection category, restricting land-use on large upland areas;
3. FLA to households has often disrupted existing land-use systems, leading to decreased soil fertility and conflicts over grazing land; and,
4. FLA has not *per se* provided sufficient incentives for afforestation.

Interviews at the provincial and central level have thus supported observations noted in previous chapters on the discrepancies between stated intentions and outcomes on the field. Multiple roots for these discrepancies have been identified:

1. The poor success of the 5MHRP in contributing to poor household incomes in the NMR is of course strongly related to the current economic and market conditions of the forestry sector. But the incentives – or rather the lack of incentives – provided by the 5MHRP to involve households in the forestry sector have also been essential. Like its predecessor Programme 327, the programme has deliberately focused on protection and special-use forest and central subsidies have been exclusively directed to the provincial forest administration and SFEs.

2. Although the interest of provincial authorities to increase protection forestry land have been related to the political-economic context (the need to support SFEs in the current reform context), the bias in land classification has been allowed and even encouraged by centrally defined rules, namely the rules for central budget allocation and an unclear definition of forest categories. It has been further facilitated by unclear discourses from the Party-State. These discourses have been ambiguous on the actual objectives of the 5MHRP, promoting afforestation as a goal *per se,* and have been equivocal about the characteristics of the protection and production forest and land categories.

3. According to the analysis led in Tien Xuan Commune and to previous studies, the negative outcomes of FLA to households on land management primarily stem from its unsuitability with the biophysical characteristics of upland areas and the customary collective rules-in-use. The underlying drivers for these outcomes thus rather arise from the design of FLA than its implementation and will be explored in **Chapter 7**. The legal recognition of CBNRM might be a promising opening towards a higher diversity of institutional arrangements and a greater adaptation to local conditions. However, this promise might not yield expected outcomes. On the one hand, in the provinces where it has been implemented, its execution has been largely driven by bureaucratic and economic interests. Provincial authorities have seen CBNRM as a means to speed up the overwhelming land allocation process to households. On the other hand, the Forest Law has not really encouraged its application by clear arguments on its benefits. Like afforestation, CBNRM has been black-boxed and when promoted, it has been depicted as inherently good. This lack of clarity on the rationale for CBNRM does not favour a sound adaptation of institutional arrangements to local conditions. Nor does it help dismissing prevailing beliefs on the ability of local people to organise themselves to manage land sustainably.

4. Lastly, the limited impact of FLA to households on afforestation is largely related with the low attractiveness of forestry and the biophysical characteristics of upland areas. The low accessibility and large extent of forestry land have greatly hindered the enforcement of the rules over land use. The increase of the protection forestry land area has accentuated the inadequacy between the task and the capacity of forest protection officers to enforce state regulations. This problem results to some

extent from the lack of co-operation between the two provincial departments in charge of land classification and forest protection.

The analysis now moves up to the central policy-making arena where these rules have been designed and discourses have been formed.

Chapter 7. Exploring the roots of discrepancies: analysis of the design of forest policies in Vietnam

"Most policies are designed by learning. They are designed from the reality, not from research."

A senior Vietnamese researcher, 2006 (formal interview, 2006)

I. Introduction

In the previous chapter, the analysis stressed the importance of discourses and centrally designed rules in the way policies have been implemented by provincial authorities. Namely, their bias or ambiguity has greatly facilitated provincial administration to shape policy implementation according to their own – or to other influential stakeholders' – interests. This chapter examines the design and formation of these rules-in-use and discourses in the policy-making arena at the central level. After a presentation of the characteristics of the analytical framework specific to this stage of analysis, policy decisions related to state-led afforestation campaigns and FLA are analysed according to the following stages:

1. Discourses on forest and land management in Vietnam are scrutinised following an archaeological approach, focusing on how dominant narratives have framed problem definition and policy options;
2. Discourses and policy changes are linked with the particular incentives faced by policy-makers to support or resist particular narratives and policy orientations; and
3. The characteristics and performance of the knowledge-policy interface are discussed, examining the evidence base for policies and the learning opportunities available to policy-makers.

Finally, the chapter concludes on the lessons learnt regarding policy design and on their implications for designing appropriate policy recommendations.

II. Methodology

II.1. Policy-process analysis

This chapter concentrates on the analytical holon where policy-makers interaction and policy design take place at the central level. Policy-makers are considered here in a wide sense and include all Party-State bodies, international and national research and development organisations, including NGOs and donors, and individuals involved in policy design at the central level.

The central level is the level where policy-makers decide on (1) the rules-in-use that regulate the access and use of forest and land; and (2) the rules-in-use that govern the implementation of policies, including the responsibilities and the decisional and budgetary power devoted to decentralised state agencies to implement policies. The holon of interest is thus located at both the collective-choice and constitutional levels of the framework. When policy decisions directly affect the rules-in-use on forest and land management at the operational level, the analyst stands at the collective-choice level. When they affect i) how central policies are transformed into provincial or district guidelines, which in turn affect the rules-in-use on forest and land management, and ii) who has control over these decisions, the analyst stands at the constitutional level.

Several frameworks, theories and models of policy process have been developed to capture the determinant drivers of policy change (see a review in Schlager, 1999). They have relied on various approaches:

1. a structural approach, focusing on the institutional and organisational apparatus of the policy process;
2. an actor-oriented approach where the actions and interactions of individuals and group of individuals are emphasised – such as the IAD framework (Ostrom, 1999) or the Advocacy Coalition Framework (Sabatier and Jenkins-Smith, 1999; Sabatier and Weible, 2006); and
3. a post-structuralist approach emphasising the role of discourses in shaping preferences and actions (Hajer, 1995).

Originally relying on one or another of these three approaches, some political ecologists have recently developed methodologies recognising simultaneously the role of structure, agency and discourses in policy analysis (e.g. Forsyth, 2003, cf. **Chapter 2**). Keeley and Scoones (2003) also combined these three theoretical perspectives in their analysis of environmental policy process to decipher the decisions of actors embedded into discursive and institutional settings.

In the same spirit, the framework for this study (**Chapter 2**) integrates several theoretical approaches. It makes actors' agency a central tenet of the policy-making arena, while also recognising the influence of the political-economic structure and discursive setting in which actors are embedded (Figure 7-1).

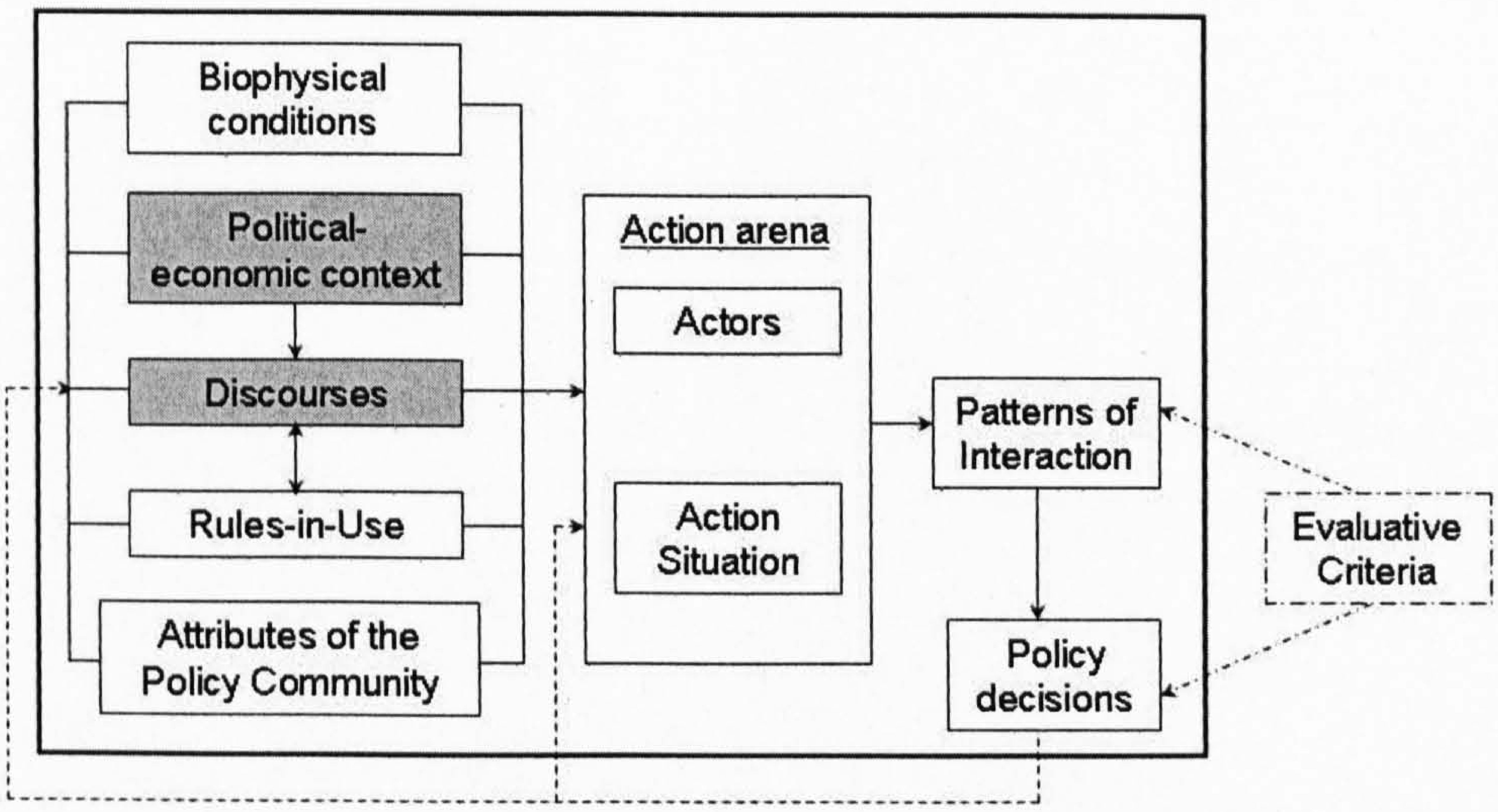


Figure 7-1. Analytical framework for policy-making analysis at the provincial level

At this level, emphasis was given to the information available to the actors located in the policy-making arena. In the IAD framework, information about actions, outcomes and their linkages constitutes one of the sub-variable of the action situation (Ostrom *et al.*, 1994, see also **Chapter 2**, Section II.2.1). Information is thus also affected by external variables. In this study, external variables were considered to influence not only the nature, content and level of information available, but also how information affects actors' decisions, i.e. its acceptability.

The originality of the proposed framework is that it is not assumed that scientific debates necessarily lead to a consensus through an exchange of objective findings. According to the discursive perspective adopted, the debates that guide environmental policy-processes are not rooted in the selection of the solutions to take, but rather in the meanings given to physical and social phenomena (Hajer, 1995). Language is thus not merely an instrument used by some actors to influence others' beliefs: its sole existence affects actors' values and beliefs (**Chapter 2** and Section II.2 in this chapter).

Analysing policy process in Vietnam is an arduous task. Outsiders such as international organisations have access and can participate to the policy debate until a certain stage, but final decisions are usually taken behind closed doors. Furthermore, the role of the CPV on policy decisions is opaque and its observation is out-of-reach for non-senior Party members. Despite these limitations, the following analysis aims to provide meaningful insights on the drivers behind afforestation campaigns and upland allocation and design and disseminate sound policy recommendations (**Chapter 8**).

II.2. Discourse analysis

Discourse analysis was applied in this study to understand why recent policy options related to forest and land management have gained predominance over others. By dictating how social and physical phenomena should be conceptualised, discourses frame what is normal and abnormal, i.e. what is relevant or possible to think, say, decide and act upon. Under this perspective, discourses form both an important factor and tool of policy change.

As advised by Gasper and Apthorpe (1996) text and context were considered simultaneously, by examining discourse coalitions, i.e. "the ensemble of (i) a set of story-lines; (ii) the actors who utter those story-lines; and (iii) the practices in which this discursive activity is based" (Hajer, 1995, p. 65). A story-line is "a generative sort of narrative that allows actors to draw upon various discursive categories to give meaning to specific physical or social phenomena" (Hajer, 1995, p. 56). Story-lines are often simplified or inaccurate formulations of the issue considered, constituting "environmental orthodoxies[54]", as labelled by Forsyth (2003) in the field of environmental politics. Story-lines stand out as powerful discursive tools as they allow the achievement of problem closure.

Problem closure is the "pre-definition of the purpose of enquiry" (Forsyth, 2003, p. 79), e.g. the *a priori* definition of the heroes, villains and victims of the story (Adger *et al.*, 2001). Problem closure might happen during research formulation or policy design, when the solution of the identified problem is implicitly contained in the problem definition. For instance, large-scale flooding is often defined and conceived as the result of human mismanagement and activities (e.g. upstream deforestation) rather than as an unpredictable natural event. Flooding mitigation strategies have thus focused on the control of upstream land management while neglecting options to reduce the

---

[54] Notorious examples of environmental orthodoxies include the belief that shifting cultivation is always destructive of forest or that forests increase surface water runoff (for more examples see Forsyth, 2003).

vulnerability and exposure of people at risk. When problem closure occurs, it is extremely difficult to challenge the underlying but not formally expressed assumptions that have fixed problem boundaries.

Text analysis was guided by a rhetorical and semiotic perspective to explore the formation of categories and the use of metaphors in story-lines and discourses. In this respect, useful concepts were provided by semantic realism. The latter differentiates "brute facts" and "institutional facts" (Searle, 1995 in Forsyth, 2003). The distinction depends on the nature of the function associated with the term considered. Brute facts are basic unfunctional descriptions of physical objects or processes whereas institutional facts carry a social meaning attributed to their function. For example, "soil erosion" is an institutional fact: it is usually associated with a negative function (e.g. decrease on-site soil fertility, silt rivers and dams) by natural scientists and policy-makers – but not necessarily by local people who experience it (Blaikie and Brookfield, 1987; Forsyth, 2003). A particular attention was given to the use of institutional facts as they support particular story-lines and contribute to problem closure.

II.3. Data collection

General information on the policy process was gathered through 36 semi-structured interviews of one hour conducted with foreigner and national researchers, bilateral and multilateral donors, international and national NGOs, consultants and civil servants (list in **Annex N**).

Interviews explored the following (see details in **Annex O**):

- the discourses related to forest, land degradation and land management;
- the organisation's activities, objectives and connections with the Party-State; and
- the drivers of recent policy changes.

In addition, detailed information on the legislative process related to the revision of the Forest Law was provided by the Vice-Director of the Legislation Department of the MARD.

Data collected during interviews were completed by grey literature, including:

- legal documents related to afforestation, e.g. the Decisions No. 327-CT and No. 661/QD_TTg related to respectively Programme 327 and the 5MHRP, the 1991 and 2004 Forest Law (see **Chapter 3**) and to upland management (Decision No. 22 NQ/TW on the policies for social and economic development in the mountainous areas);
- consultancy reports and donors publications related to afforestation, the Forestry Sector Support Partnership and upland management.

Prior to the analysis of discourses and policy-makers incentives, the following section reviews the major characteristics of the constitutional rules-in-use affecting policy design.

III. Collective-choice/constitutional rules-in-use

A prominent feature affecting policy process in Vietnam is its consensus-based style of governance (McCarty, 2001, 2002; Shanks *et al.*, 2004). According to McCarty (2001), the latter enables the Party to retain control in a market-based economy through a form of "managed democracy". The policy process has to include a wide range of stakeholders and decisions are not taken before a consensus is reached. It can result in long processes of back-and-forth negotiations since several strongly opposed ideological currents co-exist within the Party-State. The paths to accommodate socialist ethics of equity with economic reforms are often narrow and the way Vietnam shall adapt its economic and political institutions to a market-based economy has been often hotly debated between conservative, attached to central planning, and reformers (Hashimoto *et al.*, 2005).

During interviews, informants described policy formulation as a highly iterative process. This characteristic is related to the consensus-based form of governance: because a very large range of stakeholders are consulted, policy formulation follows a backward and forward process of submission, appraisal, comments and revisions until a consensus is reached.

Policy change was also described as incremental and pragmatic. Incremental because often legal modifications or new ideas are first tested at a small scale, before eventually being extended if proved to be successful. Policy-making in Vietnam has long been characterised by continuous adjustments to the legal framework. It is also pragmatic because policy change has generally been based on "models" tested on the ground. Pilot studies have been a privileged means to inform and guide policy-makers in Vietnam.

IV. The action arena: actors and action situation

This section reviews the main actors[55] who might have affected the design of FLA and afforestation policies in relation to the action situation in which they evolve, including their positions, interactions, the set of allowable decisions and actions, opportunities to share information and the specific incentives and deterrents assigned to decisions and actions.

IV.1. International development organisations

Although Vietnam has received a very high level of Overseas Development Assistance (ODA) for the past decades, it is not an aid-dependent country: ODA represents only 4-6 per cent of the GDP. Thus the GoV has a position of strong recipient vis-à-vis donors (ADB, 2007). During interviews, all donors underlined that the GoV ownership in driving policy processes was very strong[56]. In the forestry sector, ODA is expected to account for just 13 per cent of investment for 2006-2010 (Prime Minister of the Government of Vietnam, 2007b).

Major donors in forestry are ADB[57], the World Bank and among the bilateral donors Germany, Japan, Sweden, Switzerland, The Netherlands and Finland. The form and amount of aid delivered has greatly changed for the past decade. Many donors have shifted to direct budget support (e.g. the UK Department for International Development or the Swiss Agency for Development and Cooperation). Furthermore, according to the GoV, the GDP per capita will have reached USD 1,000 by 2010, making Vietnam fall into the category of middle-income countries. Most donors plan to begin to withdraw their aid after this date (source: interviews). Some observers noted that the GoV has been receptive to innovative ways of doing business because of its concern to keep attracting ODA after 2010 (Jacquemin and Bainbridge, 2005).

[55] Actors presented in this section do not include the Party-State apparatus at the central level since it was already described in **Chapter 3**.

[56] It was also the result of a recent survey on aid effectiveness in Vietnam (Jacquemin and Bainbridge, 2005).

[57] The ADB has however decided recently to move its support from forest and environmental projects to infrastructures (source: interviews).

Several mechanisms exist to develop donors/State interaction. Most donors are engaged in sectoral forums dedicated to government-donor dialogue like the International Support Group of the MARD. The forestry sector is unique in Vietnam in its early development of a discussion platform between donors and the GoV. A Partnership Support Programme was created in 1998 to support the 5MHRP. In 2001, the Forest Sector Support Programme and Partnership (FSSP&P) was established by a Memorandum of Agreement between participating donors and the Vice-Minister of the MARD. Its goal was extended to the support of the forestry sector, according to a Programme Framework divided into nine "Result Areas". Initial objectives were to establish a sector-wide approach, but the transaction costs of such an initiative were finally judged too high, especially when considering that many donors will reduce their aid in the immediate future (2006). In an effort to align aid with government's needs, the Programme Framework was recently replaced by the 2006-2020 National Forestry Development Strategy (NFS) as the guiding frame for partners to support the forestry sector. Since, the FSSP&P has been known as the Forest Sector and Support Partnership (FSSP). It counted 25 international development partners in 2007, including bilateral and multilateral donors, NGOs and a few research organisations. In parallel, the Trust Fund for Forest, was created in 2004 with the financial support of four bilateral donors (Sweden, Finland, The Netherlands and Switzerland). This fund was created to improve ODA allocation regarding forestry projects. These initiatives have been encouraged by the GoV as a means to coordinate donors' activities. The FSSP also offers a technical support to the MARD in the preparation and revision of legal documents (World Bank, 2006). From the perspective of many participating donors and NGOs, the FSSP is a useful tool for lobbying and discussing policies (source: interviews).

Despite these opportunities to exchange information with central bureaucrats, most donors qualify their impact on forest policies in Vietnam limited and often disappointing (source: interviews), especially compared to neighbouring countries such as Lao PDR and Cambodia. Vietnamese policy elite was described by respondents from international organisations as very open to their advices but at the same time very selective and critical. The Party-State has precisely defined political and economic objectives – tied to economic growth and poverty reduction – which are not negotiable. The particular situation of Vietnam relatively to ODA (i.e. a high level of aid channelled by a large number of funding agencies and a low reliance of the state budget, and particularly of the forestry sector, on aid) enables the GoV to exercise a critical selection of donors' advices and aid.

IV.2. Research organisations

Science and technology are major pillars of economic development and society's progress in the communist ideology (Marinova, 2001). Thus researchers possess a formal legitimacy in providing accurate and expert knowledge to policy-makers. However, interviews and interaction with national research institutes (RIs) indicated that their impact on policy-making is weak, especially outside the field of economics.

First, RIs are not formally involved in the policy formulation process (Dang Kim Son, 2005). This activity is reserved to the Technical Departments of the Ministry, which have their own experts and often view RIs as a competing source of knowledge – rather than as a support (source: interviews). Nevertheless, there have been recent efforts to strengthen the links between research and the MARD. The IPSARD was established in 2005 as the think tank of the MARD. It explicitly aims to carry out research activities to support agricultural and rural policy formulation. However, its research strategy is so far largely dependent on external funding opportunities rather than guided by long-term strategic choices (source: observation and interviews).

RIs concerned with forest and land issues are either under the MARD or under the Vietnam Academy of Agricultural Sciences (VAAS)[58]. Their activities can be divided into three types:

1. Conduct the studies ordered by the Science and Technology Department of the Ministry. These have been attributed since recently through bids for proposals;
2. Respond to pressing demands from the minister. Usually requested to fill in a gap in the existing knowledge, they aim to support imminent policy decisions. The minister usually prefers to entail such tasks to a friend or a trustworthy person than to experts in the area of concern (source: interviews); and

[58] The VAAS receives annual reports from all types of research activities, whether conducted by the RIs under its umbrella or led at the local level by provinces, and prepares a final synthesis for the MARD, the Ministry of Science and Technology and the Ministry of Finance.

3. Conduct research projects funded by and in partnership with international research or development organisations.

Under the current scheme, national research is thus mainly reactive to policy-makers' demand and tends to be led by short-term needs; it is rarely strategic and proactive. Internationally funded projects might offer an opportunity for national RIs to carry out research on innovative issues. However, according to interviewed Vietnamese researchers, policy-makers do not fully consider the results of internationally funded research, even when carried out by national RIs: "*When we have contracts with international organisations, the MARD doesn't care about the results*" (a senior cadre of a national RI, formal interview, 2006). International research organisations have thus little chance to influence policy-making.

Apart from formal mechanisms, there are informal opportunities for Vietnamese researchers to interact with policy-makers. These include being a member of the CPV or having privileged connections with government senior staff. The media are also increasingly being used by scholars to alert policy-makers on critical and popular issues. The press has indeed gained a great influence on policy-making (Hashimoto *et al.*, 2005) and to some extent offers a powerful means to pass on messages – unless the latter threaten the Party-State (Dixon, 2004).

In addition to their weak linkages with central bureaucrats, national RIs have also poor connections with NGOs, bilateral and multilateral donors. Interviews revealed that these relationships are usually punctual, based on short-term consultancy work. Furthermore, many development practitioners view research results as inappropriate or inapplicable because they are too technical, not adapted to the timescale of development projects or less valuable than indigenous knowledge.

As a conclusion, although formally recognised as a legitimate source of knowledge, national RIs have limited means and power to influence policies because they are isolated from the policy-making arena. The most effective way for researchers to bridge the research-policy gap is to act through informal relationships (Hashimoto *et al.*, 2005). This strategy is however risky because it relies on individuals who might change positions or loose their influence on the policy process.

IV.3. Provinces

A majority of respondents among consultants, donors and NGOs described policy process as top-down and with a very limited input of provincial government to policy design. Nevertheless, provinces have several opportunities to influence policy design and interact with the Party-State at the central level. First, provincial departments are invited to report annually to the ministries on the progress of policy implementation. However, such monitoring systems are still under-developed and information asymmetry is common because: (1) provincial departments are more accountable to the PPC than to their head Ministry (**Chapter 3**); and (2) PPCs do not have interest to report policy flaws because of their principal-agent relationship with the central government (**Chapter 6**, Section I.2). Several provincial bureaucrats expressed during interviews that centrally designed forest policies are top-down programmes which do not necessarily bring direct benefits to the province, e.g. regarding economic development. Provincial administration can easily manipulate statistics and reports since there is no external evaluation of policy implementation.

Apart from annual reporting, province leaders are sometimes invited to express their views on specific issues during provincial or national workshops. They also take part to annual meetings with the Prime Minister (Shanks *et al.*, 2004). However, some province leaders might be reluctant to criticise openly government policies during such meetings (source: interviews). In addition, provincial interaction with the central level occurs informally and on a daily basis. Some provincial bureaucrats occupy high positions at the central level in the State or Party hierarchy. Rotation between provincial and central government leaders occurs relatively often (Shanks *et al.*, 2004). According to Malesky (2004), provinces with the closest connections with the central government are the ones with the highest degree of autonomy to implement policies and eventually test new “models”. As discussed in **Chapter 3**, several “models” tested by provincial governments have been important drivers of policy change. Model-testing – whether it was encouraged, tacitly allowed, or sanctioned by the central government – is fully part of the process of policy iteration.

IV.4. Upland people

As underlined in **Chapter 3**, the channels of communication between the civil society and the Party-State are few and tightly controlled by the latter. Considering the characteristics of the NA election process, it is unlikely that deputies sitting at the NA accurately convey the diversity of views of Vietnamese people. Furthermore, because of their close affiliation with the CPV, mass organisations such as the Women's Union do not provide an appropriate forum to criticise government policies (Abuza, 2001).

According to several observers (Koh, 2001; McCarty, 2001; Shanks *et al.*, 2004), the Party-State is yet reluctant to go substantially against the perceived view of the people and has to concede power and be responsive to people's claims to conserve its legitimacy. In several occasions, policy changes have resulted from grassroots expression (**Chapter 3**). However, these means of public expression are limited. People who demonstrate might not be representative of all views. Furthermore, in most instances, demonstrations have not resulted in policy change, except when an extreme point was reached in the magnitude of people's mobilisation.

V. The rationale for afforestation campaigns

V.1. Discourses

Afforestation has been a key crusade of the GoV regarding upland environmental protection and economic development for the past decade. Discourses and associated problem framings have indeed imposed the afforestation rationale as a logical solution to identified problems.

V.1.1. Forest and land classification

Among the six land categories defined in the 1993 Land Law, the following three apply to upland hills: (1) Agricultural land; (2) Forestry land; and (3) Unused land (National Assembly of Vietnam, 1993, Article 11). It implies that upland areas not suitable for agricultural production and considered by the State as "unused" are reserved for forestry (MARD *et al.*, 2003a, p. 6). By any coercive means or prescription, land categorisation supports afforestation initiatives and reinforces the great importance given to the forestry sector in the economic development of upland regions. In the NMR, not less than 73.7 per cent of the total area is classified as forestry land (FPD, 2006).

The definition of forest categories has also had consequences on the design of state-led afforestation initiatives. Under the French colonial regime, forest was divided into "*réservée*" and "*protégée*" [59] (reserved and protected respectively) and was thus conceived as a submissive recipient of human use. In the Forest Law, "protected forest" was replaced by "protection forest" (*rừng phòng hộ* in Vietnamese), emphasising the active and utilitarian role of forests in protecting people and the environment.

Furthermore, forest utility was not defined in regard to the people who live in forests or whose livelihoods most crucially depend on forest, but according to its potential utility for the whole nation (or for a group of powerful stakeholders) as perceived by central policy-makers. For instance, production forest is important because of the raw material it provides for the national timber demand but not as a resource for local people. A researcher interviewed reported for instance that, in the case study area of one of their current research projects, the fast-growing tree species planted for the 5MHRP are not suitable for fuelwood (their burning releases large quantities of smoke). Because the forest and land categorisation imposed by the State has neither taken into account local biophysical conditions nor local people's needs, it has often collided with the local reality, producing unintended outcomes.

V.1.2. Covering the land

In the 1980s-1990s, food security held the highest priority on the agenda of central policy-makers in Vietnam. There were acute concerns over land degradation and particularly soil erosion in the NMR. A prominent issue stressed by policy-makers and reiterated in donors' reports was the existence of a widespread area identified as barren or unused land: "About 12 million ha (roughly 36 per cent) of the land in Viet Nam is classified as 'Barren' or 'unused' land -- formerly forested hilly land that predominantly lies fallow" (World Bank, 1995b, p. 9). In discourses, bare land has often been assimilated to barren land and as the result of deforestation (Box 7-1). Bare land has been intrinsically associated with soil erosion and its potential impacts on fertility, agricultural productivity and reservoirs siltation. In addition, under a managerial perspective, bare land has been considered unproductive and "wasted". This concept of "wasted land" is not new:

Box 7-1. Bare land and barren land

The denomination "bare" and "barren" land is often used inter-exchangeably in government documents or donors reports. Yet, they hold distinct meanings. Bare land (*vùng đất trọc*) means denuded, with no vegetative cover. Barren land (*vùng đất cằn* or *vùng đất hoang*) means infertile or unproductive land.

[59] Despite its name, the "protected forest" was in fact open for exploitation, which was only restricted by marketing and economic rationales (Thomas, 1998).

under the French colonial regime, land had already been categorised into forest, plantation and "waste" (Cleary, 2005). The term "bare land" is thus an "institutional fact" to which negative functions have been attached. This story-line has suggested one single rational solution: to cover and re-green the land, by establishing large tracts of forest, and to use the land through "rational" (meaning fixed) cultivation.

Programme 327, also called "Greening the Barren Hills Program", clearly integrates the elements of this narrative: "Provinces with bare land and degraded hills are to establish projects in order to use the land" (Council of Ministers, 1992, Article 1). Interestingly, according to the research community, although much research effort[60] has been devoted to land degradation by national RIs since the 1950s, policy-makers have not paid much attention to other options than afforesting to reduce or halt land degradation. The President of the VAAS, who was also formerly director of the SFRI, commented on the solutions to address land degradation in Vietnam: "*There is a big gap between policy-makers and scientists ... In Vietnam there has never been a national workshop on land degradation*" (formal interview, 2006).

In policy documents, land covers other than forest have been proposed to protect the soil. For instance, in Decision 264-CT, loans with preferential rate are available to cultivate industrial crops "if necessary measures against soil erosion are taken" (The Chairman of the Council of Ministers, 1992, Article 3). However, although Programme 327 initially included rural development projects (e.g. on husbandry and industrial crops), it rapidly and unambiguously focused on the establishment of protection forest through Decision 556 in 1995.

As indicated in **Chapter 6**, the rationale of re-greening bare hills and unused land is still present among the discourses of provincial and central government staff. In the recent MARD rural development review, it is stated that amongst 39 million ha of natural land, almost 44 per cent is "not in use" (MARD, 2005). This figure disclaims the existence of many ha of land used productively by local people (e.g. for food production or cattle grazing: Le Trong Cuc and Rambo, 2001) or rich in biodiversity (Sowerwine, 2004; Ohlsson *et al.*, 2005).

---

[60] Research on land degradation in Vietnam primarily focused on the development of new techniques to control erosion and on the testing of how different land uses impact on soil erosion and water runoff.

V.1.3. *From covering the land to afforesting*

Although many respondents from provincial FPD and Forestry sub-Department viewed the 5MHRP as the exact continuation of Programme 327, there was actually a major discursive turn between the two campaigns: the first objective (and title) changed from covering the land to establishing five million ha of forest. Planting forest has become a goal *per se*.

The 5MHRP is presented in the media and in every public document as an environmental programme – which besides can contribute to economic development, social well-being and national security. That is also how local authorities in Tien Xuan Commune referred to it during the interviews: the President of the People's Committee stated that the 5MHRP aimed "*to save the environment*" (formal interview, 2005). According to the Secretary of the Commune Party cell, the GoV has launched afforestation programmes "*to protect the environment and the animals*" (formal interview, 2005). However, interviews and a review of the grey literature suggest that the development of the forestry sector is actually a stronger preoccupation than environmental protection among the GoV and donors. For instance, none of the topics set on the agenda of the 2000 national workshop on the 5MHRP deals with environmental issues (cf. MARD, 2000). The FSSP – which acronym now also stands for "Forestry Partnership" – is a coordinated approach for the forestry sector, with little attention to environmental concerns[61]. This is not to argue that economic objectives are less valuable than environmental ones. But the mismatch between actual objectives (economic) and public discourses (environmental) has led to a lack of clarity on the means relevant to achieve these goals, affecting the achievement of both economic and environmental targets (**Chapter 6**).

In addition to environmental protection purposes, the 5MHRP aims to achieve a multiplicity of objectives: poverty alleviation, economic growth and increased employment opportunities. One of the results of a recent assessment of the 5MHRP was that "the multiple objectives are a common feature in the majority of projects" (De Jong *et al.*, 2006a, p. 64). The problem is not the multiplicity of objectives *per se* but rather the assumption, reinforced by the black box encapsulating the term "forest", that any form of afforestation will automatically and equally fulfil all of these objectives –

[61] This is noticeable in the documents and reports related to the FSSP activities (e.g. cf. 2006b).

whatever are the local conditions. No real attention has been given to the local conditions (e.g. market, infrastructure, environmental characteristics) necessary for the achievement of the pursued objectives.

This section has highlighted how discourses have framed problems and solutions and in turn legitimised national afforestation campaigns. In the next section, discourses and policies are located into the institutional and politico-economic setting to investigate why these specific discourses have been sustained.

V.2. Political-economic context and rules-in-use

In public discourses, afforestation aims to match the needs of upland communities and to improve their livelihoods by restoring the environment and developing household economy. But apart from these, afforestation campaigns suit the unuttered interests of many policy-makers (Table 7-1 and **Chapter 6**).

Table 7-1. Synthesis of the unstated economic and power-related interests of the main actors in respect to afforestation

	Economic interests	Power-related[a] interests
Central government	Attract international funding	Keep control over strategic areas along national borders Unify the nation and keep their legitimacy vis-à-vis the civil society
Provincial government	Secure state subsidies for the administration and the forestry sector Attract international funding	
Local government	Little interest (cash crop cultivation raises more tax-related revenues than forestry)	
Foresters	Keep the financial support of the State to the forestry sector	Remain influential within the polity sphere
Multilateral donors	Get return on money invested in recipient countries	Keep their legitimacy vis-à-vis other donors Keep their reputation
Bilateral donors	Provide assistance in line with their country's strategies and areas of expertise Spend the aid Develop and maintain strong relationships with the recipient to further develop economic exchanges Contribute to increase timber production to meet paper needs	Justify their action vis-à-vis their country's government and population.
NGOs	Attract donors funding	Justify their action vis-à-vis donors
Researchers	Attract funding for the institutes involved in forestry research. Little interest for other RIs	Justify their research
SFEs	Secure state subsidies and support through national programmes Sell services and material to farmers (might conflict with donors projects)	Keep the areas of land they manage

a. It means that actors acquire more abilities to exist or to compete vis-à-vis other actors
Source: interviews and Gibson et al., 2005

Firstly, there has been a strong environmental lobbying from donors since the 1990s and afforestation thus provides an easy way for the central government and some provinces to attract donors' aid and to support state agencies and government staff. Forest-related aid projects are also attractive to many funding organisations. Most bilateral donors involved in afforestation projects in Vietnam have a long tradition of forestry in their country (e.g. Switzerland, Finland, Germany, Sweden) or/and have high paper demand. The donors the most heavily involved in afforestation projects, namely Japan, Switzerland, Sweden and Germany, are the countries with the highest paper consumption in the world (Blower *et al.*, 1999). At the same time, afforestation is an issue to which many citizens of developed countries are receptive. Hence afforestation provides for donor countries a means to: (1) offer assistance while getting a return on the aid provided through the provision of skills, technologies and services to the recipient country; (2) support the production of a resource highly needed; and (3) spend the aid in a way that satisfies the civil society. The interests of multilateral donors to invest in forest-related projects are less clear. The ADB is disengaging from forestry and NRM and shifting to infrastructures – which "*moves more money*" (formal interview, 2006). The World Bank has for a long time considered forestry as a risky investment (World Bank, 2002, p. 2) because of natural hazards or tenure insecurity, but is still committed to forestry projects to regain the fame lost in the past under unsuccessful projects in the sector (source: interviews).

Gibson *et al.* (2005) have argued that the rules-in-use structuring aid delivery have played an important role in general failures of aid effectiveness. For instance, there is no feedback loop on aid success to the citizens of donor countries, who act as principal in the aid command and delivery process (the aid agency being the agent) (Gibson *et al.*, 2005). The latter have no means to control how the establishment of tree plantations actually results in poverty reduction and improved environmental conditions. The rules-in-use related to the budgetary process (e.g. pressures to disburse funds within the budgetary year) might also hinder aid effectiveness.

As underlined in **Chapter 6**, foresters, although not organised as a lobbying organisation, are particularly influential in the policy-making sphere. These actors have vested interests to sustain narratives on the environmental benefits of forest and on the economic potential of the forestry sector – but not to devolve greater responsibilities to households over forest management. Programme 327 and the 5MHRP have been means to channel foreign aid and central budget in order to support SFEs and forest administration. Although corruption was not explicitly spelled out during interviews, bribes, extortion or patronage are known to be common practices in the forestry sector. The profession of forest rangers is said to be the most lucrative profession in Vietnam – of course not because of the rangers' official salary, but because of the bribes they receive when apprehending illegal loggers and the incomes they gain by selling confiscated timber.

In addition, afforestation has provided to the Party-State a new unifying goal, after war times, for the Vietnamese nation. In 1995, the GoV created a national afforestation day in which every citizen is invited to plant a tree. Forest protection has also become one of the recurrent themes of Vietnamese propaganda posters. Afforestation has been erected as a national effort in which every citizen should be involved. It also gives an opportunity to the State to show its action for the collective good of the nation by demonstrating with increasing figures of forest cover that the Party-State has succeeded in fighting the "most important" environmental threat faced by the country – deforestation. Under the present collective-choice/constitutional rules-in-use governing State-society relationships in Vietnam, such unifying goals are essential to maintain the legitimacy of the Party: propaganda and discourses have been recurrently used to maintain political stability in communist regimes.

Thus, discourses are coherent with the political-economic context and the rules-in-use governing aid delivery and the State-society relationship. In the current central policy-making arena, many state and non-state actors have advantage to sustain environmental orthodoxies and support the discourses that fit with their interests. These multiple interests have been conciled in discourses under the all-embracing objective of afforestation.

V.3. Improving policy design: the role of information

Changing collective-choice/constitutional rules-in-use can permit to improve policy design by acting upon the formation of incentives and discourses. For example, the set of actors who participate in policy design has been dominated by Kinh people with an education in economics (source: interviews). Modifying the boundary rules to allow the representation of a more-diverse population (e.g. upland/ethnic minority people) could contribute to better suit policies to the heterogeneity of biophysical and social realities. Changing the position rules would also enable to avoid the over-influence of particular actors (e.g. foresters) on the policy process. However, developing precise recommendations on this aspect necessitates an in-depth analysis of the collective-choice/constitutional rules governing the policy process, which is extremely difficult to perform for anyone outside the very closed central policy-making arena.

V.3.1. The role of information in policy change

Another option to improve policy design is to provide to policy-makers sufficient and relevant information on the performance of current policies and accurate knowledge on upland environment and people. The role of evidence and the characteristics of current learning processes are discussed relating to recent revisions of the 5MHRP following its examination at the NA in 2006 (tenth session, NA XI). At this occasion, deputies criticised quite strongly the performance of the 5MHRP and voted substantial revisions (National Assembly of Vietnam, 2006). Firstly, the objectives of afforestation were downsized. In addition, a clear will to shift the emphasis of the programme from protection to production forest was expressed (cf. Decision 147/2007/QD-TTg "Policies to develop Production Forest in 2007-2015"). As affirmed in the 2006-2020 NFS (Prime Minister of the Government of Vietnam, 2007b) issued in February 2007, the less critical sub-category of the protection forestry land will be converted into production forestry land (it concerns around three million ha of land). This decision was already stated in the 2001-2010 NFS but interviews with provincial bureaucrats suggest that there is currently a strong will from the government to make it happen on the ground. These changes are rather positive moves as they contribute to correct the bias in the overemphasis given to forest in land uses and to protection forestry land in land classification.

However, the evidence that enabled deputies to take decisions[62] on the 5MHRP is quite poor. There is no independent monitoring and evaluation (M&E) system of the 5MHRP. In addition, partly because increasing forest cover has become a goal *per se* – but also because it is the most immediate observable impact – the evaluation of the 5MHRP by state line agencies is solely based on forest-cover estimations. Annual provincial reports assessing the impacts of the 5MHRP during 1999-2005 only include figures on forest cover, money spent and a few recommendations. An executive staff working for a bilateral donor was very critical of the programme evaluation: "*They* (the GoV) *have no evaluation of the impacts of the 661. They just know how much money they spent. They even don't know how many trees they planted*" (formal interview, 2006). No research study has indeed investigated the environmental benefits of the forest established under the programme. The evaluation of the 5MHRP recently conducted by the FSIV and the Centre for International Forestry Research (CIFOR)

[62] Deputies' decisions were actually supported / suggested by the CPV.

(De Jong *et al.*, 2006a) does not include any assessment of the environmental impacts of tree plantations (e.g. on soil, water availability or biodiversity).

V.3.2. Impact of current rules-in-use on informational problems

An examination of the current rules-in-use suggests that it is unlikely that neither provinces nor national RIs provide scientific evidence that heavily criticises the 5MHRP. The DARD, which is responsible for the programme implementation, is more accountable to the PPC, which decides on the budget and human resources than to the MARD. The provincial evaluation reports of the programme are first sent to the PPC before being transferred to the Ministry. The PPC might underline difficulties of implementation but does not have interest to strongly criticise the 5MHRP as it is a means to channel funding from the central budget to the province. Furthermore, information available to provincial authorities is also poor because of a lack of human and technical means to evaluate the impact of the programme; for instance, the officers interviewed at the DARD of Son La do not have any scientific evidence available or means to assess the effectiveness of the large tree plantations recently established upstream the Hoa Binh dam on reducing reservoir siltation. Besides, since RIs are responding to the queries of the GoV, it is unlikely that their studies challenge the predominant view of policy-makers. The FSIV-CIFOR assessment of the success of the 5MHRP has relied on interviews of government staff – who of course do not have interest in reporting flaws.

Interestingly, deputies actually did not base their recent decisions regarding the 5MHRP upon the information provided by the MARD but upon an independent study ordered by the NA. Deputies visited the DARD of several provinces to ask for figures on the programme achievements and went to the field to evaluate *de visu* several pilot studies. However, new evidence was not the only driving factor for policy change. According to several informants, internal critics on the 5MHRP had emerged within the MARD for several years. For instance, the abuses of SFEs and provinces on the area of protection forestry land were well-known. The mid-life cycle assessment of the programme was decisive to discuss these issues openly. Policy change might also be the result of a lost of momentum of foresters in the policy-making arena.

V.3.3. *Challenging prevailing discourses*

Recognising the flaws of the 5MHRP is a first step. But as long as prevailing story-lines on forests sustain, chances to improve forest policies remain limited. A few donors and international research organisations are challenging current story-lines in Vietnam, e.g.: "*Natural disasters people talk the most about are floods, but I think that landslides make much more damages. And there is nothing we can do about it. It is not by planting trees that we'll change anything. Have you read about the forest 'myths'?*" (a senior staff of a multilateral donor, formal interview, 2006). But international organisations have little credibility vis-à-vis policy-makers and the scientific evidence dismissing environmental orthodoxies faces a strong resistance from actors who have interests in sustaining these myths. A draft version of the FSIV-CIFOR study on the impact of the 5MHRP was presented and discussed at a workshop gathering policy-makers, donors and NGOs in 2006 in Hanoi. In this document, an observation questioned the MARD assumption that forests mitigate natural calamities (De Jong *et al.*, 2006b, p. 17):

> The wisdom of this thinking is being question in a recent FAO-CIFOR study (2005) that argues that forests have only little mitigating effects of large scale floods, like those referred to in this paragraph and there is no hard evidence that deforestation has increased the frequency or severity of floods. The study suggests integrated watershed management approaches instead.

In the final version, this statement was replaced by this short sentence, far less meaningful and convincing: "the link between forest cover and downstream flooding has been questioned by some FAO (2005)" (De Jong *et al.*, 2006a, p. 21). This anecdote confirms that reducing information asymmetry and providing new evidence are not sufficient to change discourses and beliefs. As advised by Roe, developing counter-narratives might be more effective (Roe, 1991; 1999).

VI. The rationale for FLA: from households to communities

This section scrutinises policy decisions related to FLA. It is organised in a similar structure than the previous section on the 5MHRP: after examining how story-lines have framed problem definition and solutions, it relates discourses with the incentives of actors participating to policy design and the external variables affecting the action arena. Lastly, it analyses the role of information and learning in the recent recognition of communities as legal recipients of forest and land property rights.

VI.1. Discourses

VI.1.1. Rationalising land management

Upland allocation has been tightly related to the narratives on deforestation and barren land. In the latter, the heroes, villains and victims have been clearly pointed out: the main culprit, an old evil[63], is shifting cultivation – and the villains, shifting cultivators: "In terms of the evolution of barren lands or forest land degradation, sedentary shifting cultivation[64] is the most extensive cause (affecting up to one million ha/year)" (World Bank, 1995b, p. ii). Since at least the French colonial regime, shifting cultivation has been presented in Vietnam as the result of the low level of education and supposed backwardness of ethnic minority people. Since these arguments became politically incorrect, shifting cultivation has been depicted as the logical consequence of poverty: local people do not have any other alternative to survive than clearing forest and practising shifting agriculture (ADB, 1997). According to this story-line, poverty and population pressure will ultimately lead to an environmental and social crisis (World Bank, 1995b, p. ii):

> Thus, in many of the over populated, upper-sloped areas in the northwestern midland provinces of Viet Nam (the high susceptibility areas), the erosion and livelihood problems are probably insurmountable if alternate income sources are not found and the population pressure on land is not reduced.

This crisis narrative has been shared by multiple actors in Vietnam: government senior staff, international donors and the most eminent Vietnamese researchers (e.g. Prof. Vo Quy, a world renowned environmental scientist, cf. in Mellac, 2000, p.43). It is actually not particular to the Vietnamese context. Dominant discourses in the international policy-making arena have identified poverty, population pressure and shifting cultivation as major causes of forest-cover decrease since the 1980s (Adger *et al.*, 2001).

Shifting cultivation has commonly been depicted as a problem to eradicate. As a result of this discursive closure, it has never been considered that shifting cultivation could be desirable and practised because of its benefits under particular biophysical, institutional and cultural conditions. Neither has it been considered that bare lands

---

[63] Shifting cultivation had already been forbidden by the French *Code Forestier* (Forestry Code) in Indochina in 1914.

[64] Sedentary shifting cultivation was defined in the same document as cultivation practised by fixed households who shift cultivation sites (World Bank, 1995, p. 19).

might be components of a larger land-use system in which they hold an important role. A study funded by the International Institute for Environment and Development (IIED) attempted to draw up a thorough – and objective – review of shifting cultivation practices in Vietnam. In the final report of the study, despite recognising rotational shifting cultivation to be (1) more labour-efficient than wet-rice cultivation; and (2) not harmful for the environment, the authors of the study do no question the need to replace it by other land management systems. As a conclusion, the report states that: "shifting agriculture contains a number of practices which (...) are sustainable. Alternative systems need to incorporate these values" (Do Dinh Sam, 1994, p. 48). Although the value of existing land-use systems is recognised, the need to replace them by new systems designed by researchers and policy-makers is presented as inevitable.

Following this line of argumentation, the government policies have offered rational solutions to upland problems. Upland allocation has been a means to stop shifting cultivation and lead to a "management by appropriate land-use practices" (Hong Sy Dong, 1995, p. 57). In policy-makers' views, sedentarisation would "stabilise lives", which is unequivocally seen as desirable, and fixed cultivation would increase agricultural productivity and halt deforestation. By applying the model of agricultural land allocation to the highlands, policy-makers have sought to "rationalise" agricultural production (ADB, 1997).

VI.1.2. The virtues of traditional land management

A counter-narrative has recently emerged and replaced the shifting cultivation narrative in the central policy-making arena. It claims that forest protection and management are better achieved if let to communities. In Vietnam, discourses over CBNRM have indeed focused on scientific rationales rather than on ideological arguments – e.g. the right of local people to manage the resources their livelihoods depend on – and policy debates have compared the efficiency of forest and land management systems under different property regimes (MARD Legislation Department, 2004). However, discourse analysis revealed that the rationality of the argumentation does not stand up to close scrutiny.

A central argument of the proponents of CBNRM has been that it is a traditional way to manage forest which had worked in the past. It is a counter-narrative to the previous story-line which points out ethnic minorities as ignorant, unable to manage land efficiently and sustainably, and responsible for deforestation. But old beliefs regarding ethnic minorities and shifting cultivation still remain. Illustrations abound: e.g. in the New Assistance Programme and Priority Sectors for Vietnam of the Japan International Cooperation Agency (JICA), "the forest area in the Central Highlands is encountering the risk of being narrowed quickly because residents still live on burning forests for cultivation" or during an interview with a senior cadre in a national RI, "*Everybody agrees that we have to stop shifting cultivation*" (formal interview, 2006). Table 7-2 shows the results of a discourse analysis based on interviews and a literature review of various legal texts, research and project reports. Findings confirm that the narrative on a spiral of population pressure-poverty-shifting cultivation-deforestation-land degradation still prevails among policy-makers.

Table 7-2. Predominant story-lines on the main challenges in the uplands in the NMR of Vietnam

	Problem	Culprit	Solution
Government staff	Barren and unproductive land Deforestation	Shifting cultivation	Fix population and allocate land Afforest
Donors and NGO staff based in Hanoi	Widespread deforestation Low productivity of agricultural systems	Population pressure Poverty	Give farmers land-use rights
Consultants	Inequity in upland allocation	Inadequate institutions	Land-use planning.
Researchers	Widespread deforestation Low productivity of agricultural systems Land degradation	Population pressure Poverty Shifting cultivation SFEs	Teach people technical solutions on how to improve land productivity
Field development practitioners	Access to information, markets and infrastructure	Information captured by local elite	*? (respondents did not propose specific actions to overcome the problems mentioned during the time of the interview)*

Source: interviews

Furthermore, discourse analysis also suggested that policy-makers do not imagine CBNRM as the devolution of rights to people to organise themselves but rather as a transfer of responsibilities to manage natural resources according to state rules. For instance, the chair of the Steering Community of the Social Forestry Training

Network[65] in Vietnam, mentioned that one reason to support CBNRM is that: "The ethnic minority, who possess valuable knowledge on traditional forest management and use, are not being utilised as much as they should be" (Bao Huy, 2006, p. 47). Local people are thus viewed as the instruments of the State to achieve state goals. A close examination of discourses has revealed that, although political debates have at a first glance discussed the rationality and efficiency of CBNRM, the arguments on which policy decisions have been based are loose and theoretically ungrounded. The traditional character of CBNRM is not *per se* a guarantee of sustainable NRM. The theoretical basis in favour of CBNRM (e.g. the freedom let to communities to craft their own rules or the importance of reciprocity and trust within a community) has indeed been left aside.

The following section examines actors' incentives and the learning process regarding the devolution of forest and land management to communities. This choice was made for two reasons: (1) the legal introduction of CBNRM is more recent than policy decisions related to FLA to households – and related information was thus easier to collect, and (2) CBNRM is a highly topical issue, as it has re-gained a high momentum among international organisations for the past decade.

VI.2. Political-economic context

As several observations made for the 5MHRP also apply for land allocation (e.g. the rules-in-use governing ODA delivery), this section discusses actors' incentives relatively shortly. Blaikie argues that in Malawi, the government has adopted CBFM under a benign form to please donors while actually still retaining control of resources (2006). This assumption does not stand in Vietnam because of the characteristics of the relationship between donors and the GoV previously outlined in this chapter. Furthermore, CBNRM meets the interests of some powerful state actors (Table 7-3), which further suggests that it has not been adopted only because of donors' pressure.

---

[65] This network which gathers several Vietnamese research institutes was created in 2002 by the Social Forestry Support Program supported by the Swiss agency for Development and Cooperation and implemented by the local branch of the Swiss NGO Helvetas.

Table 7-3. Synthesis of the non-stated economic and power-related interests of the policy-makers related to the devolution of forest and land management to communities

	Interests	
	Economic	**Power-related**
Central government	Speed-up the allocation process Please donors and attract more ODA Land management is less costly for the State compared to individual protection forest contracts	None
Provincial government	Speed-up the allocation process	None
Local government	Speed-up the allocation process	None
Foresters	None	None
Multilateral donors	None	Keep their legitimacy vis-à-vis other donors Keep their reputation
Bilateral donors	Provide assistance in line with their country's strategies and skills Spend the aid Develop and maintain strong relationships with the recipient to further develop economic exchanges	Justify their action vis-à-vis their country's government and population.
NGOs	Attract donors funding	Justify their action vis-à-vis donors
Researchers	Attract funding for the institutes involved in forestry / rural development. Little for other RIs	Justify their research
SFEs	None	None

Source: interviews

The major transfer of funds from the State to households within the 5MHRP is made through the payments of households contracted to protect and establish protection forest[66]. If let to communities, forest protection is less costly for the central government compared to these contracts, as explained by a Vietnamese senior cadre managing a donor-funded CBFM project: "*Before, the government spent a lot of money for forest ... With community forestry, people can manage forest with their own fund*" (formal interview, 2006). As outlined in **Chapter 6**, FLA to communities also eases the administrative process of land allocation for state line agencies. However, not all actors

[66] Households receive 50,000 VND (around USD 3.3) per year per ha of forest protected and 5 million VND (around USD 330) per ha of forest planted.

have interests in promoting CBNRM. For instance, foresters have been strong opponents to the devolution of forest management to communities (source: interviews). Indeed, the recognition of CBFM in the 2004 Forest Law was hotly debated. The Legislation Department of the MARD acknowledged that "legal provisions for the role and position of village population communities were thoroughly discussed and considered" (MARD Legislation Department, 2004). The next section analyses the legislative process related to the Forest Law revision and discusses the relative importance of new evidence in policy change.

VI.3. The role of information in policy change

VI.3.1. The role of information in the legislative process

The role of information in the revision of the Forest Law was emphasised by a wide range of respondents, including the Vice-Director of the Legislation Department of the MARD, donors and NGOs staff who participated to the law revision.

The MARD proposed to revise the 1991 Forest Law to the NA at the usual revision time of the Law, i.e. at the end of its ten-year life cycle. Once the NA gave its approval, a board chaired by the Minister of the MARD was set up. The board members were representatives of the Legislation Department, Forestry and Forest Protection Departments of the MARD, of the Ministry of Planning and Investment, the Ministry Of Justice (MOJ) and the MONRE. At the same time, an editorial team with representatives from the same organisations was also established to draft the law. Often, the board members held leadership positions in these organisations whereas the members of the editorial team were technical experts.

The evidence used for the law revision primarily consisted of available statistics and experts' evaluations (source: interview). The board first carried out an assessment of the implementation and impacts of the 1991 Law, based on statistics and field-based evaluations. In addition, board members conducted a policy review on all legal documents related to forest and land, including foreign laws. They collected experience from case studies on CBFM led by international organisations and provinces and conducted additional studies. Once the draft was prepared by the editorial team, it followed a series of appraisals and revisions (Table 7-4). The importance of information in the debate is clear in step 7 (Table 7-4): the Standing Committee of the

NA first refused to transfer the law proposal to the NA because of a lack of supporting evidence for CBFM.

Table 7-4. Steps characterising the legislative process associated with the revision of the Forest Law arranged in a chronological order, as described by the Vice-Director of the Legislation Department of the MARD

Step by chronological order	Action initiated by	Action directed at	Action required	Remarks on the action
1	Editorial team	Preparation board	Comments	The draft law was revised and re-submitted 10 times over a period of 20 months
2	Preparation board	Several organisations within the MARD and in other ministries	Comments	Two or three rounds of comments
3	MARD	MOJ	Appraisal	The MARD had to respond to the queries of the MOJ, by either integrating their comments or explaining why they did not
4	MARD	GoV	Review	The documents being submitted included: (1) a report on assessment results; (2) a compilation of the comments from the ministries and provinces; (3) the appraisal results of MOJ; (4) the reply from the MARD to the comments from the MOJ; (5) a cover letter; and (6) the draft law.
5	MARD	Committee of Science and Technology of the NA	Appraisal	
6	Committee of Science and Technology of the NA	Committee of Law of the NA	Inspection	
7		Standing Committee of the NA	Approval	Sent twice because the Standing Committee judged that there were insufficient supporting documents for CBFM in the first place.
8	Standing Committee of the NA	NA	Discussion	

Source: interviews

VI.3.2. Political-economic context

There has been for many years a strong resistance to devolve any social, economic or political responsibilities to communities and in general to develop any form of autonomous collective action of the civil society. However, a few years before the revision of the Forest Law, two legal decisions recognised the village as a self-governed organisation with the right to organise collective action (Decision 13/2002/QD-BNV and Decree 79/2003/ND-CP). External factors have further created a favourable political context for the legal recognition of CBFM in Vietnam. In addition to donors' mounting pressure, there has been a general trend towards the implementation of CBFM in neighbouring countries such as Nepal or Thailand.

VI.3.3. Attributes of the community

There was a collective effort to provide information before the law revision through the provision of timely and sound evidence based on a well-developed network of experts linking field results and the policy-making arena. A national working group on Community Forestry was created in 1998. It carried out a large number of pilot studies and gathered a considerable amount of evidence. Mostly composed of Vietnamese nationals, its legitimacy was higher than that of foreign consultants and international organisations. As underlined previously, Vietnamese bureaucrats will trust more a Vietnamese national than a foreigner for policy advices.

Furthermore, there was a strong cohesion and homogeneity in the community of development practitioners on the implementation of CBNRM, initiated by the Song Da River project: "*There was a mouth- to-mouth propaganda by professionals; this is the second thing that contributed to reach policy-makers. There were many professionals who copied us*" (a high cadre, GTZ, formal interview, 2006). GTZ also enlarged the community of pro-CBFM to the policy elite by organising workshops and visits of the project and more importantly, by building strong individual relationships with key government staff such as the head of the MARD Forestry Department.

VI.3.4. Rules-in-use

The collective-choice/constitutional rules-in-use have also played a role in policy decisions. The revision of the Forest Law illustrates very well the consensus-based and iterative character of the policy process. As indicated in steps 1, 2 and 7 in Table 7-4, there were multiple back-and-forth negotiations among actors participating in policy revision. This consensus-driven iteration might have contributed to the lack of clarity of the sections prone to debate in the law – such as CBFM – as consensus aims at accommodating the sometimes-colliding views of policy-makers.

VII. Conclusion

VII.1.1. Afforestation: a consensual purpose

Forest and land classification has imposed a categorisation of uplands as imagined by central policy-makers, which does not fit with local social needs and biophysical reality. In prominent story-lines, bare land is a degraded form of land resulting from deforestation. It is described as unproductive and potentially threatening lowland development. At the same time, forests have been erected as a universal panacea for environmental protection. Problem framing has thus rationally and logically led to policies aiming at covering bare hills through the establishment of tree plantations, i.e. Programme 327 and the 5MHRP.

Afforestation campaigns suit the vested interests of a wide range of policy-makers: donors, NGOs, foresters, central and provincial governments. For instance, donors may benefit from sponsoring a sector for which they can provide services and technologies. Discourses have been both a means and the result of these interests. On the one hand, blurred discourses promoting afforestation as a goal *per se* have made it possible to consensually accommodate actors' multiple interests. On the other hand, the rules-in-use governing state-society relationships (i.e. the need for the Party to conserve its legitimacy through unifying and consensual goals) have motivated central policy-makers to sustain black boxes on forest and promote afforestation campaigns through propaganda.

Learning opportunities to improve forest policies are currently relatively poor. Information gathered on the 5MHRP is incomplete. It solely reports figures of forest cover, but does not include any evidence on the environmental and socio-economic impacts of tree plantations. In addition, there are problems of information asymmetry between the central government, provincial governments and researchers related to a principal-agent relationship where none of the latter has interest in reporting policy flaws to the former. Furthermore, dismissing prominent environmental orthodoxies on forest environmental benefits encounters the resistance of actors who have strong interests in sustaining those myths. This study outlined that providing accurate knowledge is not sufficient to change discourses and beliefs.

VII.1.2. From households to communities: back to tradition?

Discourse analysis highlighted the evolution of dominant story-lines on forest and upland management over the past decades. In the old narrative, upland people were blamed for their inefficient and backward land-use practices, said to be responsible for deforestation. FLA to households arose as a means to "improve" land management by imposing fixed cultivation.

Recently, this narrative was replaced by a counter-narrative, which claims that forest and land are better managed if let to communities. However, a closer scrutiny to debates indicates that the original beliefs on shifting cultivation and on the ability of ethnic minority groups to manage forest still prevail. Moreover, the arguments used by policy-makers to justify CBNRM are loose and are not theoretically grounded. It is suspected that the recognition of communities as legal recipients of property rights stems from its potential to meet state interests rather than from a real desire to let communities manage forest and land in their own way. Under this context, high uncertainties exist on whether this form of CBNRM will raise positive outcomes regarding livelihoods improvement and forest conservation (cf. Blaikie, 2006). The analysis of the policy/knowledge interface for the revision of the Forest Law indicates that information was a key determinant in policy change, supported by a favourable political-economic context and a strong cohesion and homogeneity in the community of development practitioners. Results also indicate that the characteristics of the decision-making process (consensus-based and iterative) might have contributed to a lack of clarity in the final policy document (e.g. regarding the conditions on CBNRM implementation).

VII.1.3. Implications for policy recommendations

Major policy revisions occurred when there was a dedicated and planned time to discuss or revise policies (revision time for the Forest Law, discussion of the 5MHRP at the NA). These events are characterised by specific rules-in-use for policy-makers interaction (e.g. inclusion of a wide range of stakeholders) and attributes of the policy-making community (relatively heterogeneous). These key variables might create opportunities to include a wide range of views and engage debates that might not have otherwise occurred. Thus, timing is an important factor to consider for whom aims to influence policies (this factor was also identified in the RAPID Programme about the use of research and evidence in development policy and practice led by the British ODI: Crewe and Young, 2002).

The next chapter forms the completion of the study, assessing whether final results have matched initial objectives, drawing conclusions, presenting policy recommendations and opening directions for further research.

Chapter 8. Conclusion

I. Re-stating the scope and objectives of the study

The scope of this study was the analysis of two recent sets of forest policies implemented in Vietnam: the current state-led afforestation campaign, the 5MHRP, and the allocation of land property rights to households and communities. This study aimed at assessing whether these two sets of policies have fulfilled their objectives regarding improved land management and afforestation in the northern uplands of Vietnam, and if not, to understand the roots of the gap between stated policy intentions and outcomes. To address this goal, the study was divided into seven objectives:

1. Develop an original framework and methodology to understand how centrally designed state policies might affect the incentives and constraints that affect farmers' decisions over land use (**Chapter 2**);
2. Identify the actors and characterise the politico-economic context linked to forest and land management and the forestry sector in Vietnam (**Chapter 3**);
3. Understand how farmers' decisions over land use have been affected by upland allocation and afforestation campaigns in a given environmental, social and cultural context (**Chapter 4**);
4. Estimate actual forest-cover change in a province of Northern Vietnam. Evaluate the impact of meso-level factors on forest cover and assess its sensibility to local conditions (**Chapter 5**);
5. Identify the major outcomes of the two considered sets of policies at the regional level, link these outcomes with the policy decisions made by provincial authorities and explore the drivers for these decisions (**Chapter 6**);
6. Explore the range of factors that have affected policy design at the central level[67] and link policy-making decisions with policy outcomes observed at the provincial and local level (**Chapter 7**), and;
7. Design and disseminate relevant and appropriate policy recommendations (**Chapter 8**).

In this concluding chapter, key results are summarised and related to objectives. The main lessons are outlined with an emphasis on the contribution of the study to

[67] Central level means the central level of government.

existing research, followed by a discussion on the relevance and adequacy of the methodology. In addition, this chapter introduces the policy briefs that were developed in this study. Lastly, the final section makes recommendations with regard to further research which can usefully build on this study.

II. An overview of the major findings

First of all, the study identified the most salient outcomes of the 5MHRP and forestry land allocation (FLA) regarding land management and afforestation at the regional scale. These outcomes were linked with the decisions of actors at three institutional levels:

1. Farmers at the operational level, where decisions directly affect the use of natural resources;
2. Farmers, provincial authorities and central policy-makers at the collective-choice levels, where rules-in-use for forest and land management are designed, and;
3. Central policy-makers at the constitutional level, where the rules-in-use for policy design at the central, provincial and local levels are devised.

Actors' decisions were contextualised under a historical perspective and analysed according to a set of external variables, as defined by the research framework: the biophysical conditions, attributes of the community, rules-in-use, political-economic context and discourses. The analysis disclosed how, at each institutional level, these variables contributed to widen or reduce the gap between policy objectives and outcomes.

II.1. Observations applicable to the two sets of forest policies

Several observations were found to be equally valid for the two sets of policies considered. In both cases, forest-policy outcomes are highly dependent on local factors (**Chapters 4 and 5**). This conclusion is not surprising given the high social and ecological diversity that characterises the northern mountain region (NMR) of Vietnam but the analysis also clarified some of the differentiation mechanisms leading to the high heterogeneity and unpredictability of policy results. For instance, specific outcomes of FLA to households were observed to be the result of a particular combination of the local biophysical conditions and rules-in-use: the abandonment of annual cropping in Tien Xuan Commune was caused by the simultaneous presence of low inherent soil fertility and collective rules-in-use conciliating grazing activities and annual cultivation in the uplands (**Chapter 4**).

The analysis also revealed that discourses on forest and land management are parcelled and contradictory. On the one hand, in the central policy-making arena, discussions on afforestation have focused on timber production and forestry. On the other hand, public discourses have emphasised the environmental function of afforestation. Discourses on the devolution of natural resources management (NRM) to local people are contradictory too, but in a more subtle way. The current prominent narrative (notably prevailing in discourses directed at international organisations) argues for the devolution of NRM to local communities in the name of tradition. Yet policy-makers' assertions often contain reminiscences of the shifting cultivation narrative, which questions the ability of local communities to manage resources sustainably.

But more importantly, findings indicate that the supposed success story of forest rehabilitation in Vietnam hides many shortcomings. FLA and afforestation campaigns have not fulfilled their stated objectives. The roots for the discrepancies between stated policy intentions and actual outcomes are however distinct for these two sets of policies, as developed in the next sections.

II.2. Major results on the 5MHRP

The objectives of the 5MHRP regarding land management and land use were to "increase the forest cover to 43% of the national territory, … use open land and bare hills efficiently, … support fixed cultivation, … make forestry contribute to improvement in the socio economic situation of mountainous areas" (Prime Minister of the Government of Vietnam, 1998)

Table 8-1 presents the most salient outcomes of the state campaign observed in this study.

Table 8-1. List of major outcomes of the 5MHRP regarding land management and land use, their source of evidence and related chapter(s)

Outcome	Source of evidence	Chapter
The 5MHRP has not succeeded in involving a majority of households in forestry and making forestry contributing greatly to household incomes. Afforestation has been primarily led by the state on state-owned land; its extent has depended on available state-owned land and budget.	Interviews with farmers, provincial departments senior officials, development practitioners and policy-makers (donors, researchers), supported by the results of spatial regression analysis. Review of scientific studies.	Chapters 4, 5 and 6
There has been an over-classification of forestry land in the protection category, which has reduced land available to households for productive activities and is likely to have adverse effects on food security and livelihoods of local people.	Interviews with provincial departments senior officials, development practitioners and policy-makers and a review of documents issued by policy-makers (the GoV, donors).	Chapter 6
Information on forest cover might be inaccurate.	Comparison between figures of forest-cover change in Hoa Binh Province from Landsat satellite image analysis and government statistics. Interviews with donors.	Chapters 5 and 6
Information on the impacts of the programme is incomplete.	Interviews with provincial departments senior officials, analysis of the provincial reports on the evaluation of the 5MHRP.	

Source: this study

Figure 8-1 synthesises the underlying drivers of these outcomes identified in **Chapters 4 to 7**. It highlights the major linkages between variables which have participated in the discrepancies between policy intentions and outcomes from the village level to the central level.

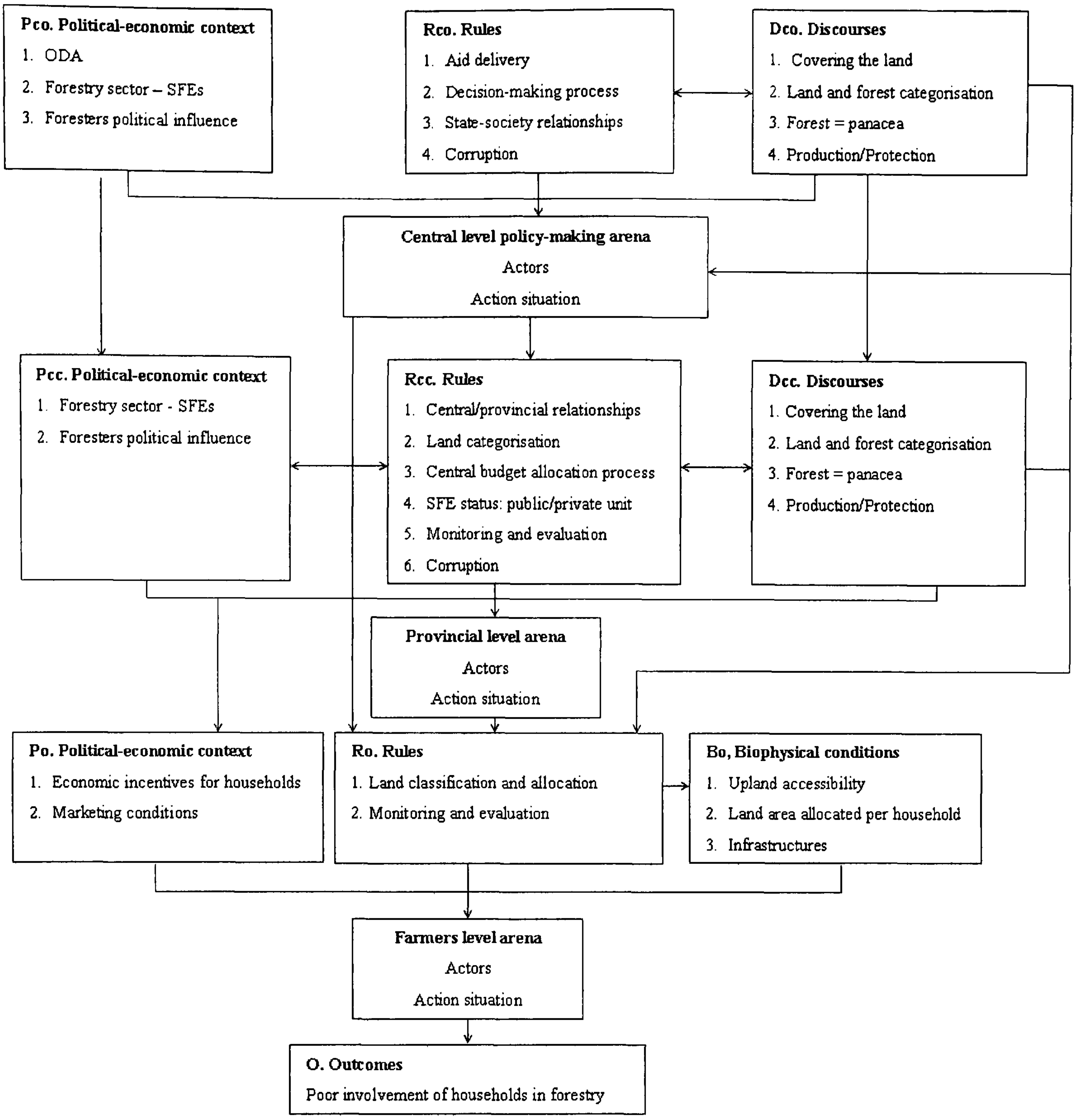


Figure 8-1. Diagram synthesising the analysis of the 5MHRP
The figure presents the main roots of the poor involvement of households in forestry in relation to state afforestation campaigns.
For Figures 8-1 to 8-3, C means central level, e.g. Rc=central-level rules-in-use; P=provincial level; l=local level. For clarity reasons, the following simplifications have been made: (1) the feedback arrows which link the variables and outcomes at the local level to upper action arenas have not been drawn; (2) the variables have only been arranged by administrative level. The institutional level does not appear but has guided every stage of the analysis process.

Several features of forestry activities (e.g. long-term investment) and the biophysical characteristics of the NMR (i.e. low accessibility, limited infrastructure for timber transportation) have constituted serious barriers to the involvement of a majority of households in the forestry sector. Nevertheless, the State has not provided the right incentives to households to reduce these obstacles. The analysis unveiled that other more-persuasive interests than developing household economy – e.g. subsidising State Forestry Enterprises (SFEs) and the forest administration – have driven the design and rationale of the 5MHRP (**Chapters 6 and 7**).

The 5MHRP has been designed as a uniform nationwide afforestation campaign in order to accommodate the various interests of policy-makers under a single goal: increase forest cover. But little attention has been given to the actual impacts of afforestation on local people and the environment. Ambiguous rules and discourses on forest classification have supported the pursuit of economic and administrative interests under the cover of environmental goals. Black boxes masking the complexity and diversity of forest ecological systems and forest services have reinforced policy-core beliefs representing forest as a panacea and legitimised the afforestation campaigns.

II.3. Major results on Forestry Land Allocation

FLA to households has aimed at stopping shifting cultivation, encouraging forest protection and rehabilitation, and supporting the adoption of efficient and sustainable land management systems. The study revealed two major outcomes (Table 8-2).

Table 8-2. List of major outcomes of FLA to households regarding land management and land use, with the source of evidence and related chapter(s) in this study

Outcome	Source of evidence	Chapter
Although FLA to households has succeeded in hindering shifting cultivation, new land management systems have had unintended negative impacts, including rapid decrease of soil fertility and conflicts over grazing areas, threatening the viability of agricultural production in some areas.	Fieldwork at the local level supported by a review of scientific studies conducted in the Vietnamese uplands	Chapters 4 and 6
FLA to households alone is not sufficient to foster afforestation	Interviews conducted with farmers, provincial authorities, policy-makers and development practitioners	Chapter 4, 5 and 6

Source: this study

These shortcomings stem mostly from a mismatch between the local socio-ecological characteristics of upland areas and the individual property system imposed by FLA to households[68]. In a post-socialist context challenging collective action and valuing individual entrepreneurship, FLA to households was seen as the rational solution to maximise land efficiency. Land allocation also conformed to geopolitical interests, e.g. the control of ethnic minorities' population and the securisation of border areas.

[68] This statement does not apply though to other outcomes of FLA, e.g. equity of land distribution.

Figure 8-2 synthesises the underlying drivers of the outcomes shown in Table 8-2. It highlights the major linkages between variables which have participated in the discrepancies between policy intentions and outcomes from the village level to the central level.

Figure 8-2. Diagram synthesising the analysis of forestry land allocation to households
The figure presents the main roots for the disruption of land-use systems and afforestation, in relation with FLA to households.

The recent recognition of community-based management is a promising option to overcome some of the shortcoming of individual property regimes in Vietnam's uplands. How this legal decision has actually been translated in the field was not investigated in this study. Nevertheless, the conclusions of the institutional and discursive analysis raise some concerns on the actual opportunities it will bring for local communities to freely organise forest and land management (Figure 8-3).

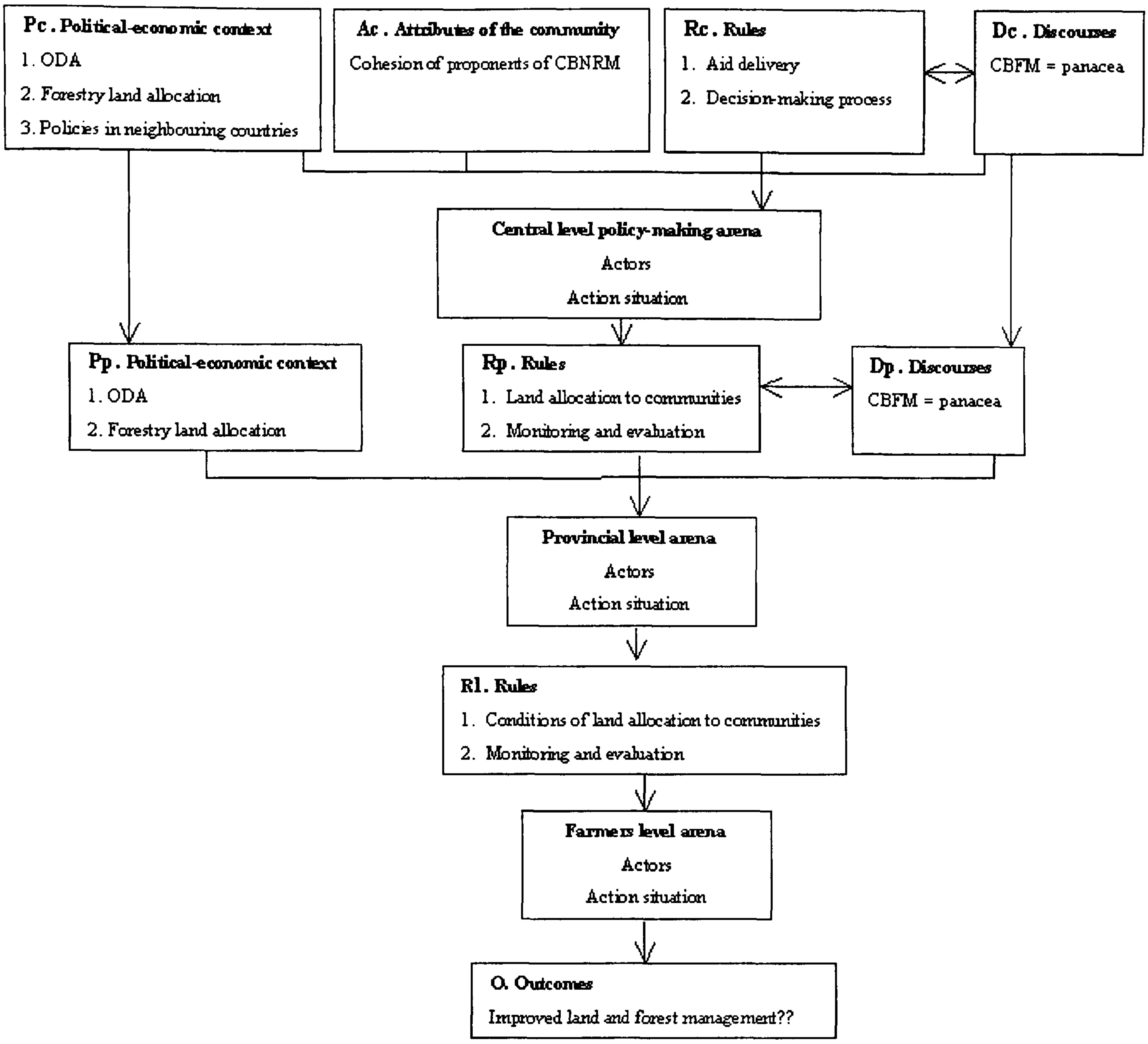


Figure 8-3. Diagram synthesising the analysis of forestry land allocation to communities
The figure questions the capacity of the legal recognition of communities as recipients of property rights to lead to improved forest and land management.

In dominant discourses, community-based management is a black box with little discussion of the conditions under which it should be set up to actually lead to better NRM. The revised Forest Law does not really encourage community-based natural resources management (CBNRM) and lacks of clarity on the conditions for its implementation. Furthermore, old beliefs questioning local people's ability to manage land collectively remain among policy-makers. As a result, policy implementation is likely to be guided by the underlying bureaucratic interests of provincial authorities rather than a desire to let local communities design and set up customary rules for forest and land management.

III. Exploring results: A multiplicity of interconnected drivers

This study has underscored the factors and mechanisms which have contributed to observed policy outcomes by using the revised Institutional Analysis and Development (IAD) framework (**Chapter 2**). It has disclosed the co-action of discourses, social processes and biophysical characteristics at multiple levels and scales of analysis, as synthesised in Figures 8-1, 8-2 and 8-3. Empirical and statistical evidence has outlined that several general theoretical assumptions are applicable in the particular context of Vietnam.

III.1.1. Power and interests

Academic studies have emphasised that policy outcomes are highly dependent on the underlying reasons driving political change (Ribot *et al.*, 2006). Particularly, there is growing evidence that some of the failures of NRM policies to achieve stated objectives stem from a divergence between stated intentions and underlying political-economic interests (Adger *et al.*, 2005; Ribot *et al.*, 2006).

This study made similar findings. Although forest policies in Vietnam have been legitimised in public discourses by poverty reduction and environmental protection objectives, their design and implementation have been driven by the politico-economic interests of a wide range of influential stakeholders. Afforestation programmes have provided a convenient means to secure overseas development assistance (ODA) and unofficially continue supporting provincial administration and SFEs (Figure 8-1, Pc). International organisations, including non-governmental organisations (NGOs) and multilateral and bilateral donors, have also had congruent politico-economic advantages in supporting afforestation, e.g. for bilateral donors, spend aid in a way which serves the economic interests of the country and gathers the approval of their citizens (Figure 8-1, Rc).

Given the high socio-ecological heterogeneity of the NMR, uniform national afforestation programmes are poorly suited to identify the locations where tree plantations might be the most appropriate land use to alleviate poverty and protect the environment. Easier and less costly to implement than locally sensitive rural development plans, national campaigns also have the advantage of accommodating the multiple interests of policy-makers under the cover of an all-encompassing goal: increase forest cover. Contrary to what is stated in public discourses, poverty alleviation and environmental protection do not figure in the major priorities of the actors who shape policy design.

Power and interests of central policy-makers have also played a role regarding land allocation to communities in Vietnam. Although the study did not investigate policy outcomes at the local level, the way CBNRM has been implemented (**Chapter 6**) suggests that the currently state-sponsored form of community-based management might not result in the actual devolution of decisional power over NRM to local communities. A major reason is that the central GoV and the administration of several provinces are more interested in the cost- and resource-effectiveness of CBNRM than convinced by its rhetoric (Figure 8-3 Pp).

III.1.2. Rules-in-use

Results support statements asserting the importance of the institutional incentives provided by the central government to lower levels of governance in policy outcomes (Andersson *et al.*, 2006; Andersson and Ostrom, 2008), e.g. its support, supervision or accountability requirements (Agrawal and Ribot, 2000; Ribot *et al.*, 2006). For instance, the current lack of financial and technical support from the central GoV to the local administration to allocate land to households (Figure 8-3, Rp) has provided incentives for provincial authorities to speed up the process by allocating land to "communities" (or to Commune People's Committees). Limited evaluation and accountability of provincial departments to the Ministry of Agriculture and Rural Development (MARD) have also favoured discrepancies in policy implementation (Figure 8-3, Rp).

Another example evidenced in the decentralisation literature relates to the ambiguity of policy decisions and documents. This ambiguity has often been a means for central bureaucrats to pursue vested interests (Dressler *et al.*, 2006; Ribot *et al.*, 2006) or to maintain national autonomy from international organisations' pressure (Grainger and Konteh, 2007). This ambiguity has also been used by the GoV: the lack of clarity in the guidelines for forest and land classification and in the public/private status of SFEs has, among other reasons, facilitated a bias in the classification of protection forestry land, enabling in this way forest administration and SFEs in some provinces to divert state funds in a greater extent than justified (Figure 8-1, Rp).

At the operational level, the study has confirmed the importance of the local rules-in-use on NRM (Gibson *et al.*, 2000a; Schweik, 2000; Nagendra, 2007). It has explicated how the individual property regime imposed by the State has disrupted existing customary collective rules with potentially high consequences on the biophysical conditions and land management (e.g. reduced soil fertility and conflicts between grazing and cultivation activities, Figure 8-2 RI, **Chapters 4 and 6**). These results are in line with previous studies conducted in Northern Vietnam (e.g. Castella *et al.*, 2006; Hager, 2006).

III.1.3. Discourses and resulting beliefs

Studies of environmental policies worldwide have often reported that policies have been misguided by simplistic accounts of complex ecological processes (Roe, 1999; Keeley and Scoones, 2003; Jiang, 2006). One analogous cause, recurrently pointed out as a root for policy failures in Vietnam (Zingerli, 2003; Sowerwine, 2004) and elsewhere (Brown, 2007), is the incongruity between the biophysical characteristics of the uplands and how the region has been imagined by the State. Almost 20 years ago, members of the Central Executive Committee of the Communist Party of Vietnam (CPV) acknowledged that lowland-biased beliefs and a lack of accurate information had been major causes for policy failures:

> The most important causes come from our weaknesses in formulating economic and social policies for the Mountain Area and in implementing them, namely in
> 1. Absence of in-depth knowledge on the important role played by the Mountain Area ... a lack of comprehensive and overall research on all problems ...
> 2. The work to establish socialist relationships of production in the Mountain Area has met many mistakes ... basing it upon models from the Deltas and not considering the standards of production and the social conditions prevailing in the Mountain Area.
>
> (CPV, 1989, Part One)

This study has also evidenced how misunderstandings of upland socio-ecological conditions have contributed to policy shortcomings. For example, the underevaluation of the resources needed for enforcing land-use regulations in upland areas has participated in the little impact of FLA to households on afforestation. The failure to appreciate the role of fallow land in mountainous land-use systems has also participated in guiding inappropriate policies focusing on "re-greening the land".

The fact that, despite its identification and acknowledgement, the misapprehension of the mountain regions has been so persistent over time suggests the presence of deeply rooted underlying drivers. This misreading, although related to lowland-biased beliefs and information asymmetry problems, ultimately results from how problems have been framed in discourses. The analysis thus reasserts the role of discourses as major drivers of policy change and policy outcomes, previously established by scholars in Vietnam (Zingerli, 2003; Sowerwine, 2004) and in other settings (Hajer, 1995; Zimmerer, 1996; Stott and Sullivan, 2000; Adger *et al.*, 2001; Forsyth, 2003; Keeley and Scoones, 2003; Blaikie and Muldavin, 2004). The mental conceptions policy-makers have of upland issues have been greatly shaped by the story-lines international and national discourses convey. A very persuasive narrative has been the assumption that the presence of forests necessarily results in improved environmental conditions (Figure 8-1, Dc, Dp and Dl; Figure 8-2, Dl). It has supported the establishment in the 5MHRP of the increase of forest cover as a goal *per se*, with little attention to the actual environmental and social impacts of newly established tree plantations. The story-line linking deforestation with shifting cultivation, demographic pressure and poverty has also been very influential and has contributed to the decision of allocating the vast areas of uplands to households and the legitimisation of its implementation on the ground (Figure 8-2, Dc, Dp and Dl).

III.1.4. Biophysical conditions and attributes of the community

One cannot but observe that policies in Vietnam have been much more successful in lowland areas than in upland regions. Biophysical conditions have indeed greatly influenced policy outcomes. As previously demonstrated by other researchers (Lam, 1998; Schweik, 2000; Tucker *et al.*, 2007), the adequacy of the rules-in-use to the biophysical conditions is essential to achieve sustainable NRM. These results are in line with the common-property theory (Ostrom, 1990; McKean, 2000). The environmental complexity and diversity of the upland areas has not been apprehended by policy-makers. Individual property regimes imposed by FLA have been ill-adapted to the biophysical, social and institutional characteristics of the NMR. The study has supported with empirical evidence the assertion that common-property regimes are better adapted than individual-property regimes to large land areas with low productivity and little accessibility (Figure 8-2, Bp and Bl).

The impact of the attributes of the community is generally difficult to capture, as actors themselves often are not aware of the presence and importance of characteristics such as trust or community homogeneity (Ostrom, 2005). The role of this variable was observed in the analysis of afforestation in the three villages of Tien Xuan Commune:

peer imitation contributed to the propagation of tree plantations after the cessation of annual cropping activities. It has also been evidenced at the provincial level: the high compartmentalisation within the state administration does not foster inter-department cooperation; it is not a matter of concern for the Department of Agriculture and Rural Development (DARD) that expanding the area of protection forestry land increases the already overwhelming control and enforcement task of forest rangers of the Forest Protection Department (FPD) (Figure 8-1, Ap).

III.2. Cross-scale interaction of the variables

One of the most prominent contributions of this analysis to existing research is to underscore the interaction, cross-scale linkages and cascading effects of the above-mentioned variables. Cross-scale linkages such as the influence of the characteristics of the constitutional rules-in-use on policy outcomes at the operational level and variable interdependence have not received much attention from the literature (Berkes, 2002; Acheson, 2006; Andersson and Ostrom, 2008).

The interaction between discourses and institutions figure among the major co-actions underscored in this study. It is particularly prominent in the particular context of Vietnam for several reasons. First, the characteristics of the communist political regime have given a prominent role to propaganda. Unifying discourses on national common goals such as afforestation have provided a key means for the CPV to maintain and reinforce its legitimacy. Moreover, the consensus-based style of governance has further accentuated the need for black-boxing: black boxes have offered the advantage of neatly accommodating the diverging interests of the wide range of policy-makers (Figure 8-1, Dc and Rc).

The study has revealed how the interaction of rules-in-use and discourses at the central and constitutional level can have repercussions down to farmers' decisions: it particularly highlighted how the consensus-based style of the decision-making process has contributed in the ambiguity of policies, e.g. regarding the conditions for forest and land allocation to communities (Figure 8-3, Rc and Rp) or the categorisation of forest and land (Figure 8-1, Rc and Rp). This lack of clarity has in turn facilitated or encouraged a bias in policy implementation to meet the interests of state forest administrations and SFEs, with serious impacts on land legally accessible to farmers for productive activities. The influence of discourses on the decisions of actors at lower institutional levels was also evidenced. Besides the lack of clarity of the rules-in-use governing land classification, ambiguous discourses on the distinction between protection/production forestry land have also facilitated the over-classification of land under protection forestry land by provincial Departments (Figure 8-1, Dp and Rl). The story-line describing shifting cultivators as responsible for an environmental disaster has affected people's imagination down to villages. In Tien Xuan Commune, many farmers believe they have to atone for their "faults" by planting trees.

IV. Guiding policies

IV.1. Designing policy recommendations

Research results have been disseminated in various forms depending on the targeted audience (Table 8-3).

Table 8-3. Means of result dissemination

Audience targeted	Means of dissemination	Format
International scientific community	Scientific publications International conferences	Article or research report Oral presentation, poster and paper
Vietnamese and international scientific community based in Vietnam	Workshops	Oral presentation
Policy-makers	Workshops Policy recommendations	Oral presentation Policy briefs

A set of policy recommendations was formulated for government staff (**Annex P**). Two policy briefs relate to the design of forest policies. The first one advises to keep flexibility in national policies, but control the implementation process by: i) increasing the accountability of province, district and commune levels to higher governance levels and to the local population, and ii) implementing a reliable monitoring and evaluation (M&E) system.

The study indicated that the general or vague feature of many Vietnamese legal documents permits certain flexibility in policy interpretation and implementation at lower governance levels (**Chapter 6**). On the one hand, it allows the adaptation of policies to local specificities, the testing of several "policy models"[69] and eventually the formulation of new lessons for policy improvements. On the other hand, the "policy models" created at the provincial or lower level are not necessarily based on sound

[69] The term "policy models" is used here because policy design in Vietnam has often relied on model testing, validation and extension.

arguments, i.e. on a will to improve policies or make these better fit to the local context. Rather they might be distorted to fit the interests of the most influential stakeholders. According to this analysis, it is recommended that flexibility is linked with responsibility and control by increasing the provincial and local governments' upward accountability (e.g. provincial departments to the Ministries) and downward acountability to the local population. It is also advised to address information asymmetry by establishing a reliable M&E system to evaluate policy implementation and impacts. Current evaluation reports on the 5MHRP only include figures of forest cover and expenditures, which do not constitute sufficient indicators to evaluate the success of forest policies and guide policy-makers. Beyond the fact that figures of forest cover are questionable, results indicate that increased forest cover does not necessarily imply poverty reduction and higher involvement of households in the forestry sector (**Chapter 4**).

The second policy brief recommends the better fitting of forest policies to the specificity and diversity of mountainous regions by providing opportunities and incentives to involve upland people in policy design, and encouraging and giving more value to local accounts of upland socio-ecological systems provided by researchers, authorities and other actors. These recommendations stem from the observation that senior staff in the Party-State bureaucracy:

- have few opportunities to get accurate knowledge on the interaction between land, forest and local communities. Their representation of the reality is based on statistics or on flash visits to provinces, with few insights on the nature of the social and environmental processes hidden behind figures and on-field models;
- have a background in economy and are not necessarily open to accounts of social and environmental processes; and
- originate from delta areas and might have a biased perception of uplands and upland people.

Interviews with policy-makers indicate that local studies are given little regard by government staff. The latter are mostly interested in macro-level analyses. However, **Chapter 4** disclosed that these analyses might hide local processes challenging macro-level conclusions. Thus a greater consideration of local studies would help policy-makers grasp the complexity and variety of upland socio-ecological conditions and comprehend the diversity of policy options which might be necessary to respond to this diversity.

The third policy brief refers to land property regimes. The study underlined the high dependence of policy outcomes on local factors and the need to adapt policies to local conditions. The legal recognition of CBNRM allows for a greater diversity of property arrangements. But a core problem is whether the Party-State will *de facto* recognise the ability of local communities to organise themselves and design their own rules. Results suggest that the Party-State is willing to let local communities manage their forest and land but only under a tight control. Farmers ought to be recognised by the State as being capable of organising themselves by devising their own rules. Thus there is a need to decentralise not only economic or technical decisions regarding land management and the commercialisation of agricultural products, but also collective-choice decisions. It is a sensitive issue as the CPV regards non-state-controlled collective action in the civil society as a potential threat to its legitimacy. However, recent legal changes (e.g. Decision 13/2002/QD-BNV and Decree 79/2003/ND-CP which recognised the village as a self-governed organisation with the right to organise collective action) indicate that there is a move towards this direction.

The third policy brief proposes to let the local communities, in agreement with the Commune People's Committee, decide themselves of the type of property regime for the uplands of their village. Although local communities hold valuable knowledge on local conditions, they might not be aware of large-scale constraints e.g. off-site impacts of agricultural practices. The Commune People's Committee in cooperation with the village leaders could be responsible for an evaluation system, which would help evaluate the outcomes of land management, in regard with local needs and large-scale constraints identified at the regional level.

IV.2. Disseminating research findings

The dissemination of results relied on the ODI Context, Evidence, and Links framework (Section V, **Chapter 2**). The three components of the framework were analysed as part of the study (**Chapter 7**). They included:

1. For the context: the identification of policy-makers and the analysis of the visible parts of the policy-process and of the best opportunities and timing to supply evidence;

2. For the evidence: an identification of the prevailing narratives and an understanding of the format of evidence required by policy-makers[70]; and
3. For the links: an identification of several key stakeholders among government staff, researchers and donors, of the networks that link them and of possible intermediaries to reach them, and an effort to establish links with these actors.

Annex Q lists the key stakeholders to which policy recommendations were transmitted.

IV.3. Current policy orientations

Several policy changes, which are worth mentioning, have occurred at the end of the course of this study, mainly regarding the 5MHRP. Firstly, the objectives of forest protection and afforestation for 2006-2010 have been reduced. Yet, the overall target of establishing five million hectares of forest remains, but shall be reached over a larger implementation period (National Assembly of Vietnam, 2006). Secondly, the Government of Vietnam (GoV) asked provinces to reduce protection forestry land (Prime Minister of the Government of Vietnam, 2007b). The less critical sub-category of the protection forestry land (which represents an area of around 3 million ha in Vietnam) is required to be converted into production forestry land. Thirdly, an M&E system for the forestry sector is being built. In this respect, the MARD stands out as one of the leading ministries committed to monitor and evaluate future policies (source: interviews). The rising counter-power provided by the National Assembly (NA) to the GoV and the progressive ideas of the acting Ministry of the MARD have contributed to these rather positive moves.

However, identifying and acknowledging the causes of policy shortcomings might not suffice. A major lesson learnt from the simultaneous analysis of discourses and rules-in-use is that proposing new rules is not sufficient to change policies if prevailing discourses do not support these rules. In Vietnam, changing dominant discourses implies the removal of the black boxes on the ability of local people to manage land sustainably and the role of forests. Roe (1999) proposes to dismiss the simplistic narratives that justify inappropriate policy interventions by proposing counter-narratives. In this respect, the scientific community has certainly a role to play. But as

[70] During the course of this research, interaction with policy-makers suggested that figures should be a central component of policy recommendations. Figures are crucial to catch their attention, get their trust and support qualitative results which might have otherwise been ignored.

argued by Forsyth (2003) and Hajer (1995), providing scientific evidence, if important, is not sufficient: scholars also need to acknowledge and clarify the co-construction of scientific knowledge and policies.

IV.4. Evaluation of the methodology

Beyond investigating the particular problematic of forest policies, this research study attempted to contribute to the methodological development of the analysis of environmental policies. It aimed at deciphering actors' micro-level decisions while drawing general lessons on the impact of macro-level policies. Overcoming this methodological challenge was possible thanks to the characteristics of the framework and methodology adopted.

The use of a general framework offered the advantage of allowing the combination of several theories or models from a wide range of disciplines. It contributed to collate results from qualitative in-depth analyses and quantitative approaches observed at various scales. For instance, the combination of spatial regression analysis with evidence collected from the interviews of provincial bureaucrats, researchers and development practitioners permitted testing the validity of local level findings at a regional scale (e.g. regarding the assumption that the allocation of upland had not *per se* did not provide sufficient incentives for farmers to establish tree plantations). The multi-methodological and multi-layered analysis facilitated a process of continuous learning, questioning and verification throughout the research using retroduction.

Methodological eclectism enabled to develop various understandings of the topic by adopting various view angles. Quantitative methods were useful to explore the questions starting with "what", "where" and "how much". For instance, Geographically Weighted Regression (GWR) was an appropriate tool to inform on the most salient drivers of forest-cover change and to provide an overview on how such drivers might vary over space on a large scale. However, as underlined by Folke *et al.* (2007), it is necessary to locate macro-mechanisms in their socio-ecological context and investigate the "how" and "why" related to the observed macro-level processes. In this respect, an ethnographic approach was particularly useful to disentangle a complex combination of the local socio-ecological processes that caused forest-cover change. The qualitative approach permitted to identify the rationale, motives and interests of multiple decisionmakers, including land users and policy-makers, and the variables affecting these interests.

What is more, combining various methods supports the collection of hybrid knowledge. It entails not only relying on multiple sources of evidence but also listening to the voices of various actors. The use of hybrid knowledge hopefully contributes to a critical assessment of research findings by confronting various social constructions of the reality. For instance, how forest and land are imagined and represented differs greatly between actors, across space or along history. Northern uplands in Vietnam have been generally perceived as a vast area of unused land by many central policy-makers, as a rugged and unfriendly landscape for provincial officers in charge of controlling law implementation or classifying land, or as a limited area which require collective arrangements to perform several types of activities such as cultivation and grazing activities in the villages investigated. Gathering the perceptions of a wide range of actors helps to understand how the motives of actors' decisions have emerged and hampers a biased analysis in favour of one group of actors versus another.

Finally, relying on multiple sources of evidence also helps to avoid the pitfalls of drawing simplistic representations of generic terms such as "the State", "policy-makers" or "local communities" by disclosing the heterogeneity of the views and interests coexisting within these groups of actors. For example, the duality of the State-society is often misleading. Despite the consensual and politically correct discourse usually prevailing in Vietnamese bureaucracy, some of the provincial officers interviewed showed a critical consideration of central policies.

IV.4.1. Politicising the IAD framework

Latour (1993) argued that contemporary issues are a hybrid originating from a combination of nature, politics and discourses. The analysis has illustrated his arguments by exposing the advantage of examining simultaneously i) biophysical conditions, ii) the political-economic context, institutions and attributes of the community, and iii) discourses. The inclusion of additional variables in the IAD framework strengthened its capacity to analyse environmental policy-processes.

Firstly, the greater attention given to the role of power and of political drivers in the birth and life of institutions enabled to examine the co-production of knowledge and policies and to have a more accurate understanding of how actors learn and might be willing or not to design new rules if supplied with new evidence. Secondly, the explicit consideration of the various perceptions that actors had of their environment was useful to acknowledge the social construction of environmental processes. In turn, it has given more-accurate understandings of the decisions actors have made regarding ecological systems. Lastly, this study has highlighted the advantage of analysing the co-production and co-action of rules-in-use and discourses. Discourses have shaped not only the rules themselves but more important, their justification and rationale, enforcing the legitimacy of policy-makers. A major policy implication is that to improve policy outcomes, one does not only need to change rules-in-use but also the prevailing discourses which legitimise the rules.

V. Directions for further research

A holistic and multi-level perspective was deliberately adopted to grasp a general and comprehensive understanding of the issue considered and to ensure that no major determinant would be missed out. However, because of the large scope of the analysis, it includes some gaps which deserve attention for further research.

Notably, more-specific policy recommendations could be developed on how to improve the performance of policy-implementation mechanisms. It could involve an in-depth institutional analysis reviewing more systematically and for a larger sample the set of rules-in-use which govern collective-choice decisions at the provincial, district and commune levels (e.g. as conducted by Andersson *et al.*, 2006). Such an analysis could involve using the enriched version of the IAD framework as developed in this study, with a particular attention on rules and cross-scale interactions.

Further research could also focus on the design of an M&E system for the 5MHRP. The MARD has recently committed towards the systematic implementation of M&E systems for every new policy. An evaluation system is being built for the forestry sector, but no reporting system exists to specifically evaluate the 5MHRP. The objectives would be to monitor the achievements of the programme by evaluating its impacts on environmental protection, economic growth, poverty reduction and livelihoods improvement and assess its efficiency regarding the mobilisation of resources and finance. It would include the development of locally sensitive indicators integrating contextual information. On the basis of the use of satellite images since

1998 (the inception year of the 5MHRP), GWR can provide a useful tool for this task. Furthermore, research could be developed to identify specifically the form and content of data policy-makers need and trust. In this respect, forest adaptive management provides an attractive framework as it explicitly acknowledges uncertainty and complexity and views management as a series of experiments which allow managers to continuously learn (Taylor *et al.*, 1997). Whereas scientists are used to deal with uncertainty in their research activities, policy-makers often seek to base their decisions on certainty and determinism (Bradshaw and Borchers, 2000). There is thus a need to specifically address the management of scientific uncertainty in decision-making (Lewis *et al.*, 1999).

Furthermore, the investigation of the opportunities to develop upland citizen voices in the policy-making arena could be explored through an analysis using the framework proposed in this study. A multi-level analysis focusing on institutions with an attention to discourses and the political-economic context would be particularly relevant. Conducting such a research in Vietnam might not be an easy task because of its high political sensitivity. However, as indicated in this study, this issue is a key tenet to improve the design of policies targeting upland areas and certainly deserves more attention.

Lastly, further work could deepen the analysis of the impact of policies on farmers' land-use decisions. This analysis relied on case studies and on modelling, based on census data. These two methods hold several limitations underlined by Janssen and Ostrom (2006). Agent-based modelling (ABM) provides an opportunity to develop an understanding of farmers' decisions by bridging the gap between context and generalisability (Janssen and Ostrom, 2006). A particular asset of ABM is its ability to combine micro-level behaviours with analysis of the macro-level economic and social context (Bithell *et al.*, 2008), its temporal dynamics (Manson, 2005) and its suitability for model human behaviour under heterogeneous conditions (Parker *et al.*, 2003). This type of modelling could be useful for policy recommendations as it implicitly recognises farmers as intelligent agents capable of devising strategies and organising collective action. These models could be used to explore the conditions for various types of property regime on environmental conservation or forestry production activities, and on the necessary incentives that policies could provide in these two cases (Bousquet *et al.*, 2007).

VI. Implications for afforestation policies worldwide

This study has provided new empirical evidence from Vietnam to support existing theoretical assumptions on NRM policies (e.g. on the importance of accountability in decentralisation policies, or on the importance of matching property regimes with the socio-ecological conditions). Besides, results have relevant implications for the design of afforestation policies worldwide.

National discourses in Vietnam hold several elements of the recent international debates on forest. Notably, they have emphasised the protection role of forest for the environment and human beings versus their productive function. In addition, like in the international "Billion Tree Campaign" conducted by the UNEP, afforestation in Vietnam has become a goal *per se* and the success of forest policies has been solely measured in terms of forest cover. However, the analysis has revealed that reassuring increasing figures of forest cover might actually hide major shortcomings. Afforestation in Vietnam has not been a success story. The 5MHRP has had a null or detrimental impact on people's livelihoods in the NMR. Furthermore, the environmental benefits of the exotic tree plantations established by the programme are highly questionable. This is not to argue that governments should not devote efforts to protect and restore forest. But according to this analysis, it is recommended that more attention is given to the design of afforestation policies to ensure that such efforts:

1. are congruent with the needs of local people whose livelihoods depend on land or forest management;
2. take into account the diversity of services generated by forests depending on local socio-ecological conditions; and
3. are evaluated in regard of environmental and social outcomes rather than on forest-cover area.

In respect to point (2), the conclusions of this study are consonant with recent scientific contributions, warning against blueprint approaches (Ostrom, 2005; Meinzen-Dick, 2007; Ostrom, 2007). As indicated in this study, a major problem to overcome policy shortcomings is that what is in the interest of local people is not necessarily in line with other more-persuasive interests of policy-makers. Even when laws are sound and fair, their implementation has often been biased in favour of the local elite or powerful national and regional stakeholders (see also Ribot and Larson, 2007). Revising forest policies is not sufficient to address such issues. The legal recognition of CBNRM in Vietnam is a positive move but the chances that it actually leads to greater decisional power over NRM devolved to local communities are thin. Profound changes of the governance system are necessary to overcome biased policy implementation and design. They include allowing a greater and equitable participation of local people in decision-making and a greater accountability of state administration to the local population.

REFERENCES

2006. Joint Review of the Forest Sector Support Program and Partnership - 2006. Review, options and a roadmap of critical decisions. Final Report - 3 May 2006. Unpublished work.

Abercrombie, N., Hill, S., Turner, B.S., 2000. The Penguin Dictionary of Sociology. Penguin Books, London.

Abuza, Z., 2001. Renovating Politics in Contemporary Vietnam. Lynne Rienner Publishers, London.

Acheson, J.M., 2006. Institutional Failure in Resource Management. Annual Review of Anthropology 35, 117-134.

ADB (Asian Development Bank), 1997. Report and Recommendation from the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Forestry Sector Project ADB, p. 64.

ADB (Asian Development Bank), 2003. Vietnam Development Report 2004: Poverty. Joint Donor Report to the Vietnam Consultative Group Meeting. December 2-3. ADB, AusAID, DFID, GTZ, JICA, Save the Children UK, UNDP, and the World Bank, Hanoi.

ADB (Asian Development Bank), 2005. Asian Development Outlook 2005. Hong Kong, China.

ADB (Asian Development Bank), AECI (Agencia Espanola de Cooperacion Internacional), AusAID (Autralian Agency for International Development), Royal Embassy of Belgium, CIDA (Canadian International Development Agency), Embassy of Denmark, DFID (Department for International Development of the United Kingdom), EC (European Commission), Ambassade de France, German Development Cooperation, Embassy of Ireland, Japan, Royal Netherlands Embassy, SDC (Swiss Agency for Development and Cooperation), USAID (United States Agency for International Development), World Bank, 2007. Aiming High. Vietnam Development Report 2007. Joint Donor report to the Vietnam Consultative Group Meeting. Hanoi, December 14-15, 2006, Hanoi, p. 184.

Adger, W.N., 1999. Evolution of Economy and Environment: An application to land use in lowland Vietnam. Ecological Economics 31, 365-379.

Adger, W.N., Benjaminsen, T.A., Brown, K., Svarstad, H., 2001. A Political Ecology of Environmental Discourses. Development & Change 32, 681-715.

Adger, W.N., Brown, K., Tompkins, E.L., 2005. The Political Economy of Cross-Scale Networks in Resource Co-Management. Ecology and Society 10, 9.

Agarwal, C., Green, G.M., Grove, J.M., Evans, T.P., Schweik, C.M., 2002. A Review and Assessment of Land-Use Change Models: Dynamics of Space, Time and Human Choice. Gen. Tech. Report NE-297. Department of Agriculture, Forest Service, Northeastern Research Station, Newton Square, PA, p. 61.

Agrawal, A., Gibson, C.C., 2001. The role of Community in Natural Resources Conservation. In: Agrawal, A., Gibson, C.C. (Eds.), Communities and the

Environment: Ethnicity, gender and the state in community-based conservation. Rutgers University Press, New Brunswick, NJ, pp. 1-31.

Agrawal, A., Goyal, S., 2001. Group Size and Collective Action. Comparative Political Studies 34, 63-93.

Agrawal, A., Ostrom, E., 2001. Collective Action, Property Rights, and Devolution of Forest and Protected Area Management. In: Meinzen-Dick, R.S., Knox, A., Di Gregorio, M. (Eds.), Collective action, Property Rights and Devolution of Natural Resource Management: Exchange of knowledge and implications for policy. Zentralstelle fur Ernaehrung und Landwirtschaft (ZEL), Food and Agriculture Development Centre (DSE), Feldafing, Germany, pp. 73-107.

Agrawal, A., Ribot, J.C., 2000. Analyzing Decentralization: A framework with South Asian and West African environmental cases. World Resources Institute, Washington, DC.

American Forest & Paper Association, 2004. China's Subsidization of its Forest Products Industry. American Forest & Paper Association, Washington DC, p. 77.

Andersson, K., Ostrom, E., 2008. Analyzing Decentralized Resource Regimes from a Polycentric Perspective. Policy Sciences 41, 71-93.

Andersson, K.P., Gibson, C.C., Lehoucq, F., 2006. Municipal Politics and Forest Governance: Comparative analysis of decentralization in Bolivia and Guatemala. World Development 34, 576-595.

Balooni, K., Singh, K., 2007. Prospects and Problems of Afforestation of Wastelands in India: A synthesis of macro- and micro-perspectives. Geoforum 38, 1276-1289.

Bangkok Post, 1993. Forest Reserves Being Depleted Despite Logging and Export Bans. Bangkok Post, May 18, Bangkok.

Bao Huy, 2006. Community Forest Management (CFM) in Vietnam: Sustainable forest management and benefit sharing. In: Oberndof, R., Durst, P., Mahanti, S., Burslem, K., Suzuki, R. (Eds.), A cut for the poor: Proceedings of the International Conference on managing forest for poverty reduction: capturing opportunities in forest harvesting and wood processing for the benefit of the poor. FAO and Regional Community Forestry Training Center (RECOFTC), Ho Chi Minh City, pp. 47-60.

Barney, K., 2005. Central Plans and Global Exports: Tracking Vietnam's forestry commodity chains and export links to China. China and Forest Trends in the Asia Pacific Region: Implications for forests and livelihoods. Forest Trends, Washington DC, p. 77.

Barrett, C.B., Reardon, T., Webb, P., 2001. Nonfarm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, dynamics, and policy implications. Food Policy 26, 315-331.

Bass, S., Morrison, E., 1994. Shifting Cultivation in Thailand, Laos and Vietnam: Regional overview and policy recommendations. In: IIED (Ed.), Forestry and Land Use Series. IIED, London, p. 74.

Batterbury, S., 1999. Book review: Third World Political Ecology, R. L. Bryant and S. Bailey. Routledge, London, 1997. Land Degradation & Development 10, 399-401.

Batterbury, S., 2006. Rescaling Governance and the Impacts of Political and Environmental Decentralization: An Introduction. World Development 34, 1851-1863.

Batterbury, S., Forsyth, T., Thomson, K., 1997. Environmental Transformations in Developing Countries: Hybrid research and democratic policy. The Geographical Journal 163, 126-132.

Berkes, F., 2002. Cross-scale Institutional Linkages. In: Committee on the Human Dimensions of Global Change, Ostrom, E., Dietz, T., Dolšak, N., Stern, P.C., Stovich, S., Weber, E.U. (Eds.), The Drama of the Commons. National Academy Press, Washington, DC, pp. 293-321.

Bhaskar, R., 1975. A Realist Theory of Science. The Harvester Press Ltd, Sussex.

Bithell, M., Brasington, J., Richards, K., 2008. Discrete-element, Individual-based and Agent-based models: Tools for interdisciplinary enquiry in geography? Geoforum 39, 625-642.

Blaikie, P., 2006. Is Small Really Beautiful? Community-based Natural Resource Management in Malawi and Botswana. World Development 34, 1942-1957.

Blaikie, P., Springate-Baginski, O., 2007. Introduction. Setting up Key Policy Issues in Participatory Forest Management. In: Springate-Baginski, O., Blaikie, P. (Eds.), Forests, People and Power. The political ecology of reform in South Asia. Earthscan, London, pp. 1-23.

Blaikie, P.M., 1985. The Political Economy of Soil Erosion in Developing Countries. Longman, London.

Blaikie, P.M., Brookfield, H.C. (Eds.), 1987. Land Degradation and Society. Methuen, London.

Blaikie, P.M., Muldavin, J.S.S., 2004. Upstream, Downstream, China, India: The politics of environment in the Himalayan region. Annals of the Association of American Geographers 94, 520-548.

Blower, N., Ngo Minh Hang, Jamieson, A., McCarty, A., Pearce, D., Pham Quang Hoan, Quirke, D., Nguyen Quoc, Mandy, T., Do Thi Binh, Hoang Van Hoa, Warner, B., Vincent, D., 1999. Paper, Prices and Politics. An evaluation of the Swedish support to the Bai Bang project in Vietnam. SIDA, Gothenburg.

Bonell, M., Bruijnzeel, L.A. (Eds.), 2005. Forests, Water and People in the Humid Tropics. Cambridge University Press, Cambridge.

Boone, R.B., Galvin, K.A., Smith, N.M., Lynn, S.J., 2000. Generalizing El Nino Effects upon Maasai Livestock using Hierarchical Clusters of Vegetation Patterns. Photogrammetric Engineering & Remote Sensing 66, 737-744.

Boserup, E., 1965. The Conditions of Agricultural Growth. George Allen & Unwin Ltd, London.

Bousquet, F., Castella, J.-C., Trébuil, G., Barnaud, C., Boissau, S., Kam, S.P., 2007. Using Multi-agent Systems in a Companion Modelling Approach for Agroecosystem Management in South-East Asia. Outlook on Agriculture 36, 57-62.

Bray, D.B., Ellis, E.A., Armijo-Canto, N., Beck, C.T., 2004. The Institutional Drivers of Sustainable Landscapes: A case study of the `Mayan Zone' in Quintana Roo, Mexico. Land Use Policy 21, 333-346.

Brown, K.M., 2007. Reconciling Moral and Legal Collective Entitlement: Implications for community-based land reform. Land Use Policy 24, 633-643.

Brown, L.R., 2001. Eco-economy : building an economy for the Earth. Earthscan Publications Ltd, London.

Bruijnzeel, L.A., Bonell, M., Gilmour, D.A., Lamb, D., 2005. Forests, Water and People in the Humid Tropics: an emerging view. In: Bruijnzeel, L.A., Bonell, M. (Eds.), Forests, Water and People in the Humid Tropics. Cambridge University Press, pp. 906-925.

Bryant, R.L., 1998. Power, Knowledge and Political Ecology in the Thirld World: A review. Progress in Physical Geography 22, 79-94.

Bryant, R.L., Bailey, S. (Eds.), 1997. Third World Political Ecology. Routledge, London.

Cairns, R.D., Lasserre, P., 2004. Reinforcing Economic Incentives for Carbon Credits for Forests. Forest Policy and Economics 6, 321-328.

Calder, I.R., 1998. Water-resource and Land-use Issues. SWIM Paper. International Water Management Institute (IWMI), Colombo, p. 24.

Calder, I.R., 2005. Blue Revolution. Earthscan Publications Ltd, London.

Carlsson, L., 2000. Policy Networks as Collective Action. Policy Studies Journal 28, 502-520.

Carter, C., Finley, W., Fry, J., Jackson, D., Willis, L., 2007. Palm Oil Markets and Future Supply. European Journal of Lipid Science and Technology 109, 307-314.

Castella, J.-C., Boissau, S., Nguyen Hai Thanh, Novosad, P., 2002. Impact of Forestland Allocation on Agriculture and Natural Resources Management in Bac Kan Province, Viet Nam. In: Castella, J.C., Dang Dinh Quang (Eds.), Doi Moi in the Mountains. Land Use Changes and Farmers' Livelihood Strategies in Bac Kan Province, Viet Nam. The Agricultural Publishing House, Hanoi, pp. 197-220.

Castella, J.C., Boissau, S., Nguyen Hai Thanh, Novosad, P., 2006. The impact of Forest Land Allocation on Land Use in a Mountainous Province of Vietnam. Land Use Policy 23, 147-160.

Chavez, P.S.J., 1996. Image-based Atmospheric Corrections: Revisited and improved. Photogrammetric Engineering and Remote Sensing 62, 1025–1036.

Chen, D., Brutsaert, W., 1998. Satellite-sensed Distribution and Spatial Patterns of Vegetation Parameters over a Tallgrass Prairie. Journal of the Atmospheric Sciences 55, 1225-1238.

Chokkalingam, U., Carandang, A.P., Pulhin, J.M., Lasco, R.D., Peras, R.J.J., Toma, T. (Eds.), 2006. One century of forest rehabilitation in the Philippines. Approaches, outcomes and lessons. CIFOR, Los Banos, Philippines.

Chomitz, K.M., Buys, P., De Luca, G., Thomas, T.S., Wertz-Kanounnikoff, S., 2006. At Loggerheads? Agricultural Expansion, Poverty Reduction, and Environment in the Tropical Forests. World Bank, Washington, DC.

Clarke, J.E., n.d. Biodiversity and Protected areas - Viet Nam. Regional Environmental Assistance 5771. Poverty reduction & Environmental Management in Remote Greater Mekong Subregion Watershed Project, Phase 1.

Cleary, M., 2005. "Valuing the Tropics": Discourses of development in the farm and forest sectors of French Indochina, circa 1900–40. Singapore Journal of Tropical Geography 26, 359-374.

Committee on the Human Dimensions of Global Change, Ostrom, E., Dietz, T., Dolšak, N., Stern, P.C., Stovich, S., Weber, E.U. (Eds.), 2002. The Drama of the Commons. National Academy Press, Washington, DC.

Cong An Nhan Dan (*Công An Nhân Dân)* (People's Police) newspaper, 2007. *Kiểm Toán Dự Án Trồng 5 Triệu Hécta Rừng Giai Đoạn 1998-2005: Thất thoát, lãng phí hàng chục tỷ đồng* (5MHRP Audit: Loosing and wasting billions of Vietnamese Dong). *Công An Nhân Dân*, Hanoi.

Congalton, R., 1991. A Review of Assessing the Accuracy of Classifications of Remotely Sensed Data. Remote Sensing of Environment 37, 35-46.

Council of Ministers, 1992. Decision No. 327-CT on Policies for the Use of Bare Land, Denuded Hills, Forests, Alluvial Flats, and Water Bodies. Official Gazette, Hanoi.

CPV (Communist Party of Vietnam) - Central Executive Committee, 1989. Politburo Decision on Guidelines and Main Policies for Economic and Social Development in the Mountain Area. Official Gazette, Hanoi.

Crewe, E., Young, J., 2002. Bridging Research and Policy: Context, evidence and links. Working Paper 173. Working Paper. Overseas Development Institute, London.

Dalle, S.P., Johns, T., De Blois, S., Caballero, J., 2006. Integrating Analyses of Local Land-use Regulations, Cultural Perceptions and Land-use/land cover Data for Assessing the Success of Community-based Conservation. Forest Ecology and Management 222, 370-383.

Dang Kim Son, 2005. Networks and International Cooperation of Public Policy Research and Training Institutions in Vietnam. In: Hashimoto, T., Hell, S., Nam, S.-W. (Eds.), Public Policy Research and Training in Vietnam. Asian Development Bank Institute, Hanoi, pp. 270-332.

Dang Nghiem Van, Chu Thai Son, Luu Hung, 1993. Ethnic Minorities in Vietnam. The Gioi Publishers, Hanoi.

DARD (Department of Agriculture and Rural Development) Hoa Binh, 1997. Report of the results of land allocation and land use after forest land allocation in Hoa Binh. DARD, Hoa Binh.

DARD (Department of Agriculture and Rural Development) Hoa Binh, 2005. *Báo Cáo. Sơ kết thực hiện dự án trồng mới 5 triệu ha rừng giai đoạn (1999 - 2004) - tỉnh Hòa Bình* (Report. Synthesis of the achievements of the 5MHRP project (1999-2004), Hoa Binh province). DARD Hoa Binh, Hoa Binh, p. 13.

DARD (Department of Agriculture and Rural Development) Thai Nguyen, 2006. *Báo Cáo. Kết quả thực hiện dự án 661 từ năm từ 1999 - 2005, kế hoạch năm 2006 của tỉnh Thái Nguyên* (Report. Results of the 661 project from 1999 - 2005 and plan for 2006, Thai Nguyen province). DARD Thai Nguyen, Thai Nguyen.

De Jong, W., Do Dinh Sam, Trieu Van Hung, 2006a. Forest Rehabilitation in Vietnam: Histories, realities and future. CIFOR, Bogor, Jakarta, p. 76.

De Jong, W., Do Dinh Sam, Trieu Van Hung, 2006b. Forest Rehabilitation in Vietnam: Histories, realities and future - First Full draft presented at a meeting in Hanoi on 28 February 2006. Unpublished, p. 60.

De Koninck, R., 1997. *Le Recul de la Forêt au Viet Nam.* Centre de Recherche pour le Developpement International, Ottawa.

De Koninck, R., 1999. Deforestation in Viet Nam. IDRC, Ottawa.

Denzau, A.T., North, D.C., 1994. Shared Mental Models, Ideologies and Institutions. Kyclos 47, 1-31.

Deputy Prime Minister of the Government of Vietnam, 2005. Announcement. Conclusions of the standing Deputy Prime Minister Nguyen Tan Dung in a review workshop on the implementation of the 5 Million (M) Hectares Reforestation Program and forest protection. Office of Government, Hanoi.

Dequech, D., 2006. The New Institutional Economics and the Theory of Behaviour under Uncertainty. Journal of Economic Behavior & Organization 59, 109-131.

DiGregorio, M., Rambo, A.T., Yanagisawa, M., 2003. Clean, Green and Beautiful: Environment and development under the renovation economy. In: Luong, H.V. (Ed.), Postwar Vietnam: Dynamics of a transforming society. Rowman and Littlefield Publishers, Lanham, Md, pp. 171-200.

Dinh Duc Thuan, 2005. Forestry, Poverty Reduction and Rural Livelihoods in Vietnam. Labour and Social Affair Publishing House, Hanoi.

Dixon, C., 2004. State, Party and Political Change in Vietnam. In: McCargo, D. (Ed.), Rethinking Vietnam. RoutledgeCurzon, London, pp. 15-26.

Do Dinh Sam, 1994. Shifting Cultivation in Vietnam: Its social, economic and environmental values relative to alternative land use. IIED, London.

Do Dinh Sam, 1998. The Forest Policy of Vietnam and the Role of the People's Participation in Forest Protection and Development. In: Institute for Global Environmental Strategies (IGES) (Ed.), A Step toward Forest Conservation Strategy.

Interim Report, IGES Forest Conservation Project. IGES, Kanagawa, Japan, pp. 268-278.

Do Dinh Sam, Le Quang Trung, 2001. Forest Policy Trends in Vietnam. Policy Trend Report. Institute for Global Environmental Strategy (IGES), Kanagawa, pp. 69-73.

Dressler, W., Kull, C.A., Meredith, T.C., 2006. The Politics of Decentralizing National Parks Management in the Philippines. Political Geography 25, 789-816.

Du, H., 2006. The Relationship between Transport and Land Value: A local model approach using Tyne and Wear as a case study. School of Civil Engineering and Geosciences. Newcastle University, Newcastle upon Tyne, p. 188.

Dupar, M., Badenoch, N., 2002. Environment, Livelihoods and Local Institutions: Decentralization in mainland Southeast Asia. In: Institute, W.R. (Ed.), World Resources Institute Report. World Resources Institute, Washington DC.

EASRD (Rural Development & Natural Resources East Asia & Pacific Region), 2005. State Forest Enterprise Reform in Vietnam. Review of policy and implementation framework for decree 200. Technical Note for the World Bank. World Bank, Hanoi.

Economic & Social Research Council (ESRC), 2006. Research Ethics Framework (REF). ESRC, London.

Economic and Social Council of the United Nations (ECOSOC), 2007. United Nations Forum on Forests. Reports of the seventh session. Official records, 2007. UN, New York.

Edwards, V.M., Steins, N.A., 1999. A Framework for Analysing Contextual Factors in Common Pool Resource Research. Journal of Environmental Policy & Planning 1, 205 - 221.

Elbers, C., Lanjouw, J.O., Lanjouw, P., 2005. Imputed Welfare Estimates in Regression Analysis. Journal of Economic Geography 5, 101-118.

Ellis, F., 1998. Household Strategies and Rural Livelihood Diversification. Journal of Development Studies 35, 1-38.

Escobar, A., 1996. Constructing Nature. Elements for a poststructural political ecology. In: Peet, R., Watts, M. (Eds.), Liberation Ecologies: Environment, development and social movements. Routledge, London, pp. 46-67.

Eucken, W., 1951. The Foundations of Economics: History and Theory in the Analysis of Economic Reality. University of Chicago Press, Chicago.

Evans, T.P., Manire, A., de Castro, F., Brondizio, E., McCracken, S., 2001. A Dynamic Model of Household Decision-making and Parcel Level Land-cover Change in the Eastern Amazon. Ecological Modelling 143, 95-113.

Fairhead, J., Leach, M., 1996. Misreading the African Landscape: Society and ecology in a forest-savanna mosaic. Cambridge University Press, Cambridge.

Fairhead, J., Leach, M., 1998. Reframing Deforestation: Global analyses and local realities; Studies in West Africa Routledge, London.

FAO (Food and Agriculture Organization of the United Nations), 1985. Tropical Forestry Action Plan. FAO, Rome.

FAO (Food and Agriculture Organization of the United Nations), 2005. Global Forest Resources Assessment 2005. FAO, Rome.

FAO (United Nations Food and Agriculture Organization), 1981. Tropical Forest Resources Assessment Project (in the framework of the Global Environment Monitoring System - GEMS). Forest resources of tropical Asia. FAO, Rome.

FAO (United Nations Food and Agriculture Organization), 1993. Forest Resources Assessment 1990 - Tropical Countries. FAO, Rome.

FAO (United Nations Food and Agriculture Organization), 2000. Global Forest Resources Assessment 2000. FAO, Rome.

Fforde, A., 1997. Vietnam Economic Commentary and Analysis. Aduki Pty. Ltd., Canberra.

Folke, C., Pritchard, L., Berkes, F., Colding, J., Svedin, U., 2007. The Problem of Fit between Ecosystems and Institutions: Ten years later. Ecology and Society 12.

Føllesdal, A., 1998. Subsidiarity. Journal of Political Philosophy 6, 190-218.

Foody, G.M., Cutler, M.E., McMorrow, J., Pelz, D., Tangki, H., Boyd, D.S., Douglas, I., 2001. Mapping the Biomass of Bornean Tropical Rain Forest from Remotely Sensed Data. Global Ecology and Biogeography 10, 379-387.

Forsyth, T., 1996. Science, Myth and Knowledge: Testing Himalayan environmental degradation in Thailand. Geoforum 27, 375-392.

Forsyth, T., 2001. Critical Realism and Political Ecology. In: López, J., Potter, G. (Eds.), After Postmodernism: An introduction to critical realism. The Athlone Press, London, pp. 146-154.

Forsyth, T., 2003. Critical Political Ecology. The politics of environmental science. Routledge, New York.

Fortech, 1998. Program 327: Review for the Vietnam rural development strategy. Prepared for the World Bank. Fortech, Canberra, pp. 15-16.

Fotheringham, A.S., Brunsdon, C., Charlton, M.E., 1998. Geographically Weighted Regression: A natural evolution of the expansion method for spatial data analysis. Environment and Planning A 30.

Fotheringham, A.S., Brunsdon, C., Charlton, M.E., 2002. Geographically Weighted Regression: The analysis of spatially varying relationships. Wiley, Chichester.

Fotheringham, A.S., Curtis, A., Densham, P.J., 1995. The Zone Definition Problem and Location-Allocation Modelling. Geographical analysis 27, 60-77.

Foucault, M., 1969/1984. *Linguistique et Sciences Sociales*. Revue Tunisienne de sciences sociales, no. 19, 1969, 248-255. In: Gallimard (Ed.), *Dits et Ecrits* 1954 -1988. Gallimard, Paris, p. 821.

Foucault, M., 1975. *Surveiller et Punir. Naissance de la prison.* Gallimard, Paris.

Foucault, M., 1976. *Histoire de la Sexualité, vol. 1 : La volonté de savoir.* Gallimard, Paris.

Foucault, M., 1980. Power/knowledge: Selected interviews and other writings, 1972-1977. Harvester Wheatsheaf, London.

FPD (Forest Protection Department), 2006. *Số liệu điễn biến rừng hàng năm* (Figures on the evolution of forest by year). http://www.kiemlam.org.vn/Desktop.aspx/News/So-lieu-dien-bien-rung-hang-nam/, Last accessed March 2008.

FPD (Forest Protection Department) Hoa Binh, 2000. *Biểu Tổng Hợp Giao Dất Khoán Rừng Theo NĐ 02/CP Từ Năm 1995-1999* (Table of Land Allocation and Contracted Forest according to Decree ND 02/CP from 1995 to 1999). FPD Hoa Binh, Hoa Binh.

French, J.R.P., Raven, B.H., 1959. The Bases of Social Power. In: Cartwright, D. (Ed.), Studies in Social Power. Institute for Social Research Ann Arbor, MI, pp. 150-167.

Frohlich, N., Oppenheimer, J., Bond, P., Boschman, I., 1984. Beyond Economic Man: Altruism, egalitarianism, and difference maximizing. The Journal of Conflict Resolution 28, 3-24.

FSIV (Forest Science Institute of Vietnam), IIED (International Institute for Environment and Development), 2002. Do Forests Protect Watersheds? A short summary of current thinking on the links between land use, hydrological functions of watersheds and local livelihoods in Vietnam. IIED, London, UK, p. 13.

Fujisaka, S., Hurtado, L., Uribe, R., 1996. A Working Classification of Slash-and-Burn Agricultural Systems. Agroforestry Systems 34, 151-169.

Gasper, D., Apthorpe, R., 1996. Introduction: Discourse analysis and policy discourse. European Journal of Development Research 8, 1-15.

Geist, H., Lambin, E.F., 2002. Proximate Causes and Underlying Driving Forces of Tropical Deforestation. Bioscience 52, 143-150.

General Statistics Office of Vietnam (GSO), 2006. Statistical Yearbook of Vietnam. General Statistics Office of Vietnam,, Hanoi.

Geoghegan, J., Villar, S.C., Klepeis, P., Mendoza, P.M., Ogneva-Himmelberger, Y., Chowdhury, R.R., Turner II, B.L., Vance, C., 2001. Modeling Tropical Deforestation in the Southern Yucatan Peninsular Region: Comparing survey and satellite data. Agriculture, Ecosystems & Environment 85, 25-46.

Gergen, K., 1999. An Invitation to Social Construction. Sage, London.

Ghate, R., 2003. Global Gains at Local Costs: Imposing protected areas: evidence from central India. The International Journal of Sustainable Development and World Ecology 10, 377-389.

Gibson, C.C., Andersson, K., Ostrom, E., Shivakumar, S. (Eds.), 2005. The Samaritan's Dilemma: The Political Economy of Development Aid. Oxford University Press, Oxford.

Gibson, C.C., McKean, M.A., Ostrom, E., 2000a. Explaining Deforestation : The role of local institutions. In: Gibson, C.C., McKean, M.A., Ostrom, E. (Eds.), People and Forests: Communities, institutions, and governance. MIT Press, Cambridge, Mass., pp. 1-26.

Gibson, C.C., McKean, M.A., Ostrom, E. (Eds.), 2000b. People and Forests: Communities, institutions, and governance. MIT Press, Cambridge, Mass.

Gibson, C.C., Ostrom, E., Ahn, T.K., 2000c. The Concept of Scale and the Human Dimensions of Global Change: A survey. Ecological Economics 32, 217-239.

Giri, C., Defourny, P., Shrestha, S., 2003. Land Cover Characterization and Mapping of Continental Southeast Asia Using Multi-resolution Satellite Sensor Data. International Journal of Remote Sensing 24, 4181-4196.

Gomiero, T., Pettenella, D., Trieu Giang Phan, Paoletti, M.G., 2000. Vietnamese Uplands: Environmental and socio-economic perspective of forest land allocation and deforestation process. Environment, Development and Sustainability 2, 119-142.

GoV (Government of the Socialist Republic of Vietnam), 1994. Regulations on the Allocation of Forestry Land to Organisations, Households, Individuals for Stable and Long Term Use for Forestry Purposes. Decree No. 02-CP. National Political Publishing House, Hanoi.

GoV (Government of the Socialist Republic of Vietnam), 1998. On the Exercise of Democracy in Communes. Decree No. 29/1998/ND-CP.5.11.1998b. Official Gazette, Hanoi.

GoV (Government of the Socialist Republic of Vietnam), 2005. National report to the Fifth Session of the United Nations Forum on Forests, http://www.un.org/esa/forests/pdf/national_reports/unff5/vietnam.pdf, last accessed March 2008.

Grainger, A., Konteh, W., 2007. Autonomy, Ambiguity and Symbolism in African Politics: The development of forest policy in Sierra Leone. Land Use Policy 24, 42-61.

Gray, L.C., 1999. Is Land Being Degraded? A multi-scale investigation of landscape change in southwestern Burkina Faso. Land Degradation and Development 10, 329-343.

Greener, I., 2005. The Potential of Path Dependence in Political Studies. Politics 25, 62-72.

Groff, R., 2004. Critical Realism, Post-positivism and the Possibility of Knowledge. Routledge, London.

Grossheim, M., 2004. Local Government in Pre-colonial and Colonial Vietnam. In: Kerkvliet, B.J.T., Marr, D. (Eds.), Beyond Hanoi. Local Government in Vietnam. ISEAS Publications and NIAS Press, Copenhagen and Singapore, pp. 54-89.

GSO (General Statistics Office of Vietnam), 2001. Population and Housing Census Vietnam 1999 - Completed census results. Statistical Publishing House, Hanoi.

GSO (General Statistics Office of Vietnam), 2006. Statistical data. Agriculture, Forestry and Fishery, http://www.gso.gov.vn, Last accessed March 2008. GSO, Hanoi.

Hager, J., 2006. Effects of the Land Allocation Process and Market-oriented Economy on Common Grazing Land of Ethnic Minorities in Northwest Vietnam. Survival of the Commons: Mounting challenges and new realities. Eleventh biennial conference of the IASCP (International Association for the Study of Common Property)". IASCP (International Association for the Study of Common Property), Ubud, Bali.

Haining, R., 1990. Spatial Data Analysis in the Social and Environmental Sciences. Cambridge University Press, Cambridge.

Hajer, M.J., 1995. The Politics of Environmental Discourse: Ecological modernization and the policy process. Oxford University Press, Oxford, UK.

Hardin, G., 1968. The Tragedy of the Commons. Science 162, 1243-1248.

Haroon Akram-Lodhi, A., 2005. Vietnam's Agriculture: Processes of Rich Peasant's Accumulation and Mechanisms of Social Differentiation. Journal of Agrarian Change 5, 73-116.

Harré, R., 1972. The Philosophies of Science. Oxford University Press, Oxford.

Hashimoto, T., Hell, S., Nam, S.-W. (Eds.), 2005. Public Policy Research and Training in Vietnam. Hanoi.

Hong, L., Page, S.E., 2004. Groups of Diverse Problem Solvers Can Outperform Groups of High-Ability Problem Solvers. Proceedings of the National Academy of Sciences in the United States of America 101, 16385-16389.

Hong Sy Dong, 1995. Status of Watershed Management in Vietnam. In: Sharma, P.N., Wagley, M.P. (Eds.), The Status of Watershed Management in Asia: Farmer-Centred Agriculture Resource Management Program (FARM). Watershed Management in Tropics and Upper Himalayas (WMTUH)/FARM Program, RAS/93/063, FAO/UNDP, Kathmandu, Nepal, pp. 56-59.

Hy Van Luong, 2003. Postwar Vietnam: Dynamics of a transforming society. Rowman and Littlefield Publishers, Lanham, Md.

IFPRI (International Food Policy Research Institute), 2003. Income Diversification and Poverty in Northern Uplands of Vietnam. IFPRI) Markets Trade and Institutions Division, Washington, DC, p. 265.

Imperial, M.T., 1999. Institutional Analysis and Ecosystem-Based Management: The Institutional Analysis and Development framework. Environmental Management 24, 449-465.

Irwin, E.G., Geoghegan, J., 2001. Theory, Data, Methods: Developing spatially explicit economic models of land use change. Agriculture, Ecosystems & Environment 85, 7-23.

Ives, J.D., Messerli, B., Janski, L., 2002. Mountain Research in South Central Asia: An overview of 25 years of UNU's Mountain Project. Global Environmental Research 6, 59-71.

Jackson, R.B., Jobbagy, E.G., Avissar, R., Roy, S.B., Barrett, D.J., Cook, C.W., Farley, K.A., le Maitre, D.C., McCarl, B.A., Murray, B.C., 2005. Trading Water for Carbon with Biological Carbon Sequestration. Science 310, 1944-1947.

Jacquemin, A., Bainbridge, B., 2005. Perceptions of Development Partners and Evidence on Aid Effectiveness: Viet Nam case study. DFID, London.

Jaiyeoba, I.A., 1998. Changes in Soil Properties Related to Conversion of Savannah Woodland into Pine and Eucalyptus Plantations, Northern Nigeria. Land Degradation and Development 9, 207-215.

Jakobsen, J., Rasmussen, K., Leisz, S., Folving, R., Nguyen Vinh Quang, 2007. The Effects of Land Tenure Policy on Rural Livelihoods and Food Sufficiency in the Upland Village of Que, North Central Vietnam. Agric. Syst. 94, 309-319.

Jamal, V., Jansen, K., 1998. Agrarian Transition in Viet Nam. Working Paper. International Labour Office, Geneva.

Janssen, M.A., Ostrom, E., 2006. Governing Social-Ecological Systems. In: Tesfatsion, L., Judd, K.L. (Eds.), Handbook of Computational Economics: Agent-Based Computational Economics. Elsevier Publishers, Amsterdam, pp. 1465-1509.

Jerve, A.M., Nørlund, I., Ha, N.T., Suhrke, A., 1999. A Leap of Faith. A story of Swedish aid and paper production in Vietnam – the Bai Bang project, 1969–1996. SIDA Evaluation Report. SIDA, Stockholm, Sweden.

Jiang, H., 2006. Decentralization, Ecological Construction, and the Environment in Post-Reform China: Case study from Uxin Banner, Inner Mongolia. World Development 34, 1907-1921.

Keeley, J., Scoones, I., 2003. Understanding Environmental Policy Processes: Cases from Africa. Earthscan Publications Ltd, London.

Kerkvliet, B.J.T., 1995. Village-State Relations in Vietnam: The effect of everyday politics on decollectivization. The Journal of Asian Studies 54, 396-418.

Kerkvliet, B.J.T., 2001. An Approach for Analysing State-Society Relations in Vietnam. Sojourn 16, 238-278.

Kerkvliet, B.J.T., 2003. Authorities and the People: An analysis of state - society relations in Vietnam. In: Luong, H.V. (Ed.), Postwar Vietnam: Dynamics of a transforming society. Rowman and Littlefield Publishers, Lanham, Md, pp. 27-54.

Kerkvliet, B.J.T., 2004. Surveying Local Government and Authority in Contemporary Vietnam. In: Kerkvliet, B.J.T., Marr, D. (Eds.), Beyond Hanoi: Local Government in Vietnam. ISEAS Publications and NIAS Press, Copenhagen and Singapore, pp. 1-27.

Khoestler, A., 1967. The Ghost in the Machine. Hutchinson, London.

Kiser, L., Ostrom, E., 1982. The Three Worlds of Action: A metatheoretical synthesis of institutional approaches. In: Ostrom, E. (Ed.), Strategies of Political Inquiry. Sage, Beverly Hills (CA), pp. 179-222.

Koh, D.W.H., 2001. Negotiating the Socialist State in Vietnam through Local Administrators: The case of karaoke shops. Sojourn 16, 279-305.

Kohli, A., Evans, P.B., Katzenstein, P.J., Przeworski, A., Rudolph, S.H., Scott, J.C., Skocpol, T., 1995. The Role of Theory in Comparative Politics: A symposium World Politics 48, 1-22.

Lam, W.F., 1998. Governing Irrigation Systems in Nepal. Institutions, infrastructure, and collective action. ICS Press, Oakland, CA.

Lambin, E.F., Turner, B.L., Geist, H.J., Agbola, S.B., Angelsen, A., Bruce, J.W., Coomes, O.T., Dirzo, R., Fischer, G., Folke, C., George, P.S., Homewood, K., Imbernon, J., Leemans, R., Li, X., Moran, E.F., Mortimore, M., Ramakrishnan, P.S., Richards, J.F., Skanes, H., Steffen, W., Stone, G.D., Svedin, U., Veldkamp, T.A., Vogel, C., Xu, J., 2001. The Causes of Land-use and Land-cover Change: Moving beyond the myths. Global Environmental Change 11, 261-269.

Lang, C., 1996. Reforestation in Vietnam in the Context of the Globalization of the Pulp and Paper Industry. Oxford, Oxford.

Lang, C., 2001. Deforestation in Vietnam, Laos, and Cambodia. In: Vajpeyi, D.K. (Ed.), Deforestation, Environment, and Sustainable Development: A comparative analysis. Praeger, London, pp. 111-137.

Larson, A.M., 2003. Decentralisation and Forest Management in Latin America: Towards a working model. Public Administration and Development 23, 211-226.

Latour, B., 1987. Science in Action: How to follow scientists and engineers through society. Open University Press, Milton Keynes.

Latour, B., 1993. *Nous n'avons Jamais été Modernes*. Poche, Paris.

Le Trong Cuc, Rambo, A.T. (Eds.), 2001. Bright Peaks, Dark Valleys. A comparative analysis of environmental and social conditions and development trends in five communities in Vietnam's northern mountain region. The National Political Publishing House, Hanoi.

Leach, M., Mearns, R., Scoones, I., 1999. Environmental Entitlements: Dynamics and institutions in community-based natural resources management. World Development 27, 225-247.

Lestrelin, G., Giordano, M., Keohavong, B., 2004. When Conservation Leads to Land Degradation: Lessons from Ban Lak Sip, Laos. IWMI Research report. IWMI (International Water Management Institute), Colombo, Sri Lanka.

Liljeström, R., Lindskog, E., Nguyen Van Ang, Vuong Xuan Tinh, 1998. Profit and Poverty in Rural Vietnam. Curzon Press, Richmond, Surrey.

Lukes, S., 2005. Power: A radical view. Palgrave Macmillan, Basingstoke.

Maglinao, A.R., Penning de Vries, F., Bricquet, J.-P., 2001. Consortium Approach to Soil Erosion Management: A potential key in sustaining upland development in Asia. International Conference on Sustaining Upland Development in Southeast Asia, Makati City, Philippines.

Majid-Cooke, F., 1995. The politics of Sustained Yield Forest Management in Malaysia: Constructing the boundaries of time, control and consent. Geoforum 26, 445-458.

Malesky, E., 2004. Leveled Mountains and Broken Fences: Measuring and analyzing de facto decentralization in Vietnam. European Journal of South East Asian Studies 3, 307-337.

Maniates, M.F., 1990. Organizational Designs for Achieving Sustainability: The opportunities, limitations, and dangers of state-local collaboration for common property management. First Annual Meeting of the International Association for the Study of Common Property "Designing Sustainability on the Commons", Durham, NC.

Manson, S., 2006. Land Use in the Southern Yucatan Peninsular Region of Mexico: Scenarios of population and institutional change. Computers, Environment and Urban Systems 30, 230-253.

Manson, S.M., 2005. Agent-based Modeling and Genetic Programming for Modeling Land Change in the Southern Yucatan Peninsular Region of Mexico. Agriculture, Ecosystems & Environment 111, 47-62.

MARD (Ministry of Agriculture and Rural Development), 2000. Proceedings of the National Workshop on Challenges and Vision for the 5 Million Ha Reforestation Program. Secretariat of the 5MHRP Partnership, Hanoi.

MARD (Ministry of Agriculture and Rural Development), 2005a. Draft National Forestry Strategy 2006-2020. MARD, Hanoi.

MARD (Ministry of Agriculture and Rural Development), 2005b. Review on Rural Development Situation in Vietnam. Hanoi.

MARD (Ministry of Agriculture and Rural Development), 5MHRP Partnership Secretariat, 2001. Five Million Hectare Reforestation Program Partnership. Synthesis report. MARD - International Cooperation Department. 5MHRP Partnership Secretariat, Hanoi.

MARD (Ministry of Agriculture and Rural Development), FSSP CO (Forest and Sector Support Partnership Coordination Office), GTZ REFAS project, 2003a. Forest plantation. Forest Sector Manual. MARD, Hanoi.

MARD (Ministry of Agriculture and Rural Development), FSSP CO (Forest and Sector Support Partnership Coordination Office), GTZ REFAS project, 2003b. Forestry Development Orientation. Forest Sector Manual. MARD, Hanoi.

MARD (Ministry of Agriculture and Rural Development), FSSP CO (Forest and Sector Support Partnership Coordination Office), GTZ REFAS project, 2003c. Land Use Classification, Planning and Allocation of Forest Land. Draft. Forest Sector Manual. MARD, Hanoi.

MARD (Ministry of Agriculture and Rural Development), FSSP CO (Forest and Sector Support Partnership Coordination Office), GTZ REFAS project, 2003d. Natural Environment and Forest Data in Vietnam. Forest Sector Manual. MARD, Hanoi.

MARD Legislation Department, 2004. Major Modifications of Law on Forest Protection and Development 2004. MARD, Hanoi.

Marinova, D., 2001. Eastern European Patenting Activities in the USA. Technovation 21, 571-584.

Marshall, G. (Ed), 1998. Oxford Dictionary of Sociology. Oxford University Press, Oxford, UK.

Mather, A., 2007. Recent Asian Forest Transitions in relation to Forest Transition Theory. International Forestry Review 9, 491-502.

Mawhood, P., 1983. Local Government in the Third World. John Wiley, Chichester.

McCarty, A., 2001. Governance Institutions and Incentives in Vietnam. Public Sector Challenges and Government Reforms in South East Asia. Public Economics, EconWPA, Jakarta, p. 38.

McCarty, A., 2002. The Policy Making Process in Vietnam. Public Administration Reform Study. Working Paper for the Asian Development Bank. Mekong Economics, Hanoi, p. 78.

McCusker, B., Carr, E.R., 2006. The Co-production of Livelihoods and Land Use Change: Case studies from South Africa and Ghana. Geoforum 37, 790-804.

McElwee, P., 2004. You Say Illegal, I Say Legal: The relationship between 'illegal' logging and land tenure, poverty, and forest use rights in Vietnam. Journal of Sustainable Forestry 19, 97-135.

McKean, M.A., 2000. Common Property. In: Gibson, C.C., McKean, M.A., Ostrom, E. (Eds.), People and Forests: Communities, institutions, and governance. MIT Press, Cambridge, Mass., pp. 27-55.

Meinzen-Dick, R., 2007. Beyond Panaceas in Water Institutions. Proceedings of the National Academy of Science in the United States of America 104, 15200–15205.

Mellac, G.M., 2000. *Des Forêts Sans Partage. Dynamique de l'espace et utilisation des ressources dans un district de montagne au Nord Viet Nam.* Ph.D. diss. Université Michel de Montaigne - Bordeaux III, Bordeaux, France, p. 608.

Messer, N., Townsley, P., 2003. Local Institutions and Livelihoods: Guidelines for analysis. Food and Agriculture Organisation, Rome.

Meyfroidt, P., Lambin, E.F., 2008. The Causes of the Reforestation in Vietnam. Land Use Policy 25, 182-197.

Michaud, J., Turner, S., Roche, Y., 2002. Mapping Ethnic Diversity in Highland Northern Vietnam. Geojournal 57, 305-323.

Ministry of Agriculture and Rural Development (MARD), 2005. Review on Rural Development Situation in Vietnam. Hanoi.

Minot, N., Baulch, B., Epprecht, M., 2003. Poverty and Inequality in Vietnam: Spatial patterns and geographic determinants. International Food Policy Research Institute and Institute of Development Studies, Hanoi.

Minot, N., Epprecht, M., Tran Thi Tram Anh, Le Quang Trung, 2006. Income Diversification and Poverty in the Northern Uplands of Vietnam. IFPRI (International Food Policy Research Institute), Washington, DC.

MOF (Ministry of Forestry), 1991. Vietnam Forestry Sector Review. Tropical Forestry Action Programme. Main report. Social Republic of Vietnam, Hanoi, p. 201.

MoSTE (Ministry of Science Technology and Environment), National Environmental Agency, 2001. The 2001 State of the Environment Report of Vietnam. Hanoi.

Muldavin, J.S.S., 1996. The Political Ecology of Agrarian Reform in China: The case of Helongjiang province. In: Peet, R., Watts, M. (Eds.), Liberation Ecologies: Environment, development and social movements. Routledge, London, pp. 227-259.

Muller, D., Epprecht, M., Sunderlin, W.D., 2006. Where are the Poor and Where are the Trees?: Targeting of poverty reduction and forest conservation in Vietnam. Center for International Forestry Research (CIFOR), Bogor, Jakarta, Indonesia.

Muller, D., Zeller, M., 2002. Land Use Dynamics in the Central Highlands of Vietnam: A spatial model combining village survey data with satellite image interpretation. Agricultural Economics 27, 333-354.

Nabuurs, G.J., Masera O., Andrasko K., Benitez-Ponce P., Boer R., Dutschke M., Elsiddig E., Ford-Robertson J., Frumhoff P., Karjalainen T., Krankina O., Kurz W.A., Matsumoto M., Oyhantcabal W., Ravindranath N.H. , Sanz Sanchez M.J., X., Z., 2007. Forestry. In: Metz, B., Davidson, O.R., Bosch, P.R., Dave, R., Meyer, L.A. (Eds.), Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK and New York, USA.

Nagendra, H., 2007. Drivers of Reforestation in Human-dominated Forests. Proceedings of the National Academy of Science in the United States of America 104, 15218–15223.

National Assembly of Vietnam, 1991. Law on Forest Protection and Development. National Political Publishing House, Hanoi.

National Assembly of Vietnam, 1992. Constitution of the Socialist Republic of Vietnam National Political Publishing House, Hanoi.

National Assembly of Vietnam, 1993. Land Law. National Political Publishing House, Hanoi.

National Assembly of Vietnam, 2004. Law on Forest Protection and Development. National Political Publishing House, Hanoi.

National Assembly of Vietnam, 2006. Resolution on adjustment of targets and tasks of the 5 Million Hectare Reforestation Project in 2006 – 2010. No. 73/2006/QH11. National Political Publishing House, Hanoi.

Neef, A., Schwarzmeier, R., 2001. Land Tenure Systems and Rights in Trees and Forests: Interdependencies, dynamics and the role of development cooperation - case studies from mainland southeast Asia. In: GTZ (Ed.), Sector Project: Importance of land policy and land tenure in developing countries. GTZ.

Neumann, R.P., 2005. Making Political Ecology. Oxford University Press, London.

Ngo Thi Minh Hang, 1995. A Cost-benefit Analysis of Smallholder Investments in Reforestation in Coastal Vietnam. College of Business, Management Department. Boise State University, p. 81.

Nguyen Nghia Bien, 2001. Forest Management Systems in the Uplands of Vietnam: Social, economic and environmental perspectives. Economy and Environment Program for South East Asia, Singapore.

Nguyen Quang Tan, 2006a. Forest Devolution in Vietnam: Differentiation in benefits from forest among local households. Forest Policy and Economics 8, 409-420.

Nguyen Quang Tan, 2006b. Trends in Forest Ownership, Forest Resources Tenure and Institutional Arrangements: Are they contributing to better forest management and poverty reduction? Case study from Vietnam. Understanding Forest Tenure in South and Southeast Asia - Forestry Policy and Institutions Working Paper No 14. Food and Agriculture Organization (FAO), Rome, pp. 355-407.

Nguyen Sin Cuc, 2003. Vietnam Agriculture and Rural Area in the Renovation Period. Statistics Publishing House, Hanoi.

Nguyen Thanh Lam, Patanothai, A., Rambo, A.T., 2004. Recent Changes in the Composite Swidden Farming System of a Da Bac Tai Ethnic Minority Community in Vietnam's Northern Mountain Region. Southeast Asian Studies 42, 273-293.

Nguyen Thi Chuc, Piara Singh, Srinivas K., Ramakrishna A., Nguyen The Chinh, Nguyen Van Thanh, Wani S.P., Tran Dinh Long, 2006. Yield Gap Analysis of Major Rainfed Crops of Northern Vietnam Using Simulation Modeling. Global Theme on Agroecosystems Report No. 26. International Crops Research Institute for the Semi-Arid Tropics, Patancheru 502 324, Andhra Pradesh, India, p. 40.

Nguyen Van Bo, Bui Dinh Dinh, Ho Quang Duc, Bui Huy Hien, Dang Tho Loc, Thai Phien, Nguyen Van Ty, 2002. The Basic Information of Main Soil Units of Vietnam. National Institute for Soils and Fertilizers, Hanoi.

Nguyen Xuan Nguyen, Salmi, J., Le Quang Trung, 1999. Study on Financing Strategy for Sustainable Forest Management in Vietnam. Overview of financing mechanisms for sustainable forestry development in Vietnam. Programme on Forests. PROFOR Viet Nam. Profor Viet Nam Issues. Ministry of Agriculture and Rural Development (MARD), United Nations Development Programme (UNDP), Hanoi, p. 31.

North, D.C., 1981. Structure and Change in Economic History. W.W. Norton and Co., New York.

North, D.C., 1990. Institutions, Institutional Change and Organisations. Cambridge University Press, Cambridge.

Nunan, F., 2006. Empowerment and Institutions: Managing fisheries in Uganda. World Development 34, 1316–1332.

Ohlsson, B., Sandewall, M., Sandewall, R.K., Nguyen Huy Phon, 2005. Government plans and farmers intentions: A study on forest land use planning in Vietnam. Ambio 34, 248-255.

Olivier De Sardan, J.-P., 1995. *La Politique du Terrain, sur la Production de Données en Anthropologie. Les terrains de l'enquête* 1, 71-112.

Olson, M., 1965. The Logic of Collective Action. Public goods and the theory of groups. Harvard University Press, Cambridge, Massachusetts.

Openshaw, S., 1984. 'The Modifiable Areal Unit Problem', Concepts and Techniques in Modern Geography. Geo Books Norwich.

Ostrom, E., 1990. Governing the Commons. The evolution of institutions for collective action. Cambridge University Press, Cambridge.

Ostrom, E., 1999. Institutional Rational Choice. An assessment of the institutional analysis and development framework. In: Sabatier, P.A. (Ed.), Theories of the Policy Process. Westview Press, Boulder, Colorado, pp. 35-71.

Ostrom, E., 2005. Understanding Institutional Diversity. Princeton University Press, Princeton, NJ.

Ostrom, E., 2007. A Diagnostic Approach for Going beyond Panaceas. Proceedings of the National Academy of Science in the United States of America 104, 15181–15187.

Ostrom, E., Gardner, R., Walker, J., 1994. Rules, Games & Common-Pool Resources. The University of Michigan Press, Ann Arbor.

Ostrom, E., Nagendra, H., 2006. Insights on Linking Forest, Trees, and People from the Air, on the Ground and in the Laboratory. Proceedings of the National Academy of Sciences in the United States of America 103, 19224-19231.

Ostrom, V., Feeny, D., Picht, H., 1993. Institutional Analysis and Development: Rethinking the terms of choice. In: Ostrom, V., Feeny, D., Picht, H. (Eds.), Rethinking Institutional Analysis and Development. Issues, alternatives and choices. Institute for Contemporary Studies, San Francisco, CA, pp. 439-466.

Overmars, K.P., Verburg, P.H., 2006. Multilevel Modelling of Land Use from Field to Village Level in the Philippines. Agricultural Systems 89, 435-456.

Oxford English Dictionary, 2008a. Belief, http://dictionary.oed.com/, last accessed March 2008.

Oxford English Dictionary, 2008b. Bureaucracy, http://dictionary.oed.com/, last accessed March 2008.

Parker, D.C., Manson, S.M., Janssen, M.A., Hoffmann, M.J., Deadman, P., 2003. Multi-Agent Systems for the Simulation of Land-Use and Land-Cover Change: A Review. Annals of the Association of American Geographers 93, 314-337.

Peet, R., Watts, M., 1996a. Liberation Ecologies: Development, sustainability, and environment in an age of market triumphalism. In: Peet, R., Watts, M. (Eds.), Liberation Ecologies: Environment, development and social movements. Routledge, London, pp. 1-45.

Peet, R., Watts, M. (Eds.), 1996b. Liberation Ecologies: Environment, development and social movements. Routledge, London.

Poffenberger, M., Nguyen Huy Phon, 1998. The National Forest Sector. In: Poffenberger, M. (Ed.), Stewards of Vietnam's Uplands Forests. Asia Forest Network and Forest Inventory and Planning Institute, Berkeley (Ca), USA, pp. 1-17.

Prime Minister of the Government of Vietnam, 1998. On Objectives, Tasks, Policy and Organisation for the Implementation of the 5 Million Hectares Afforestation National Programme., Decision 661/QD-TTg National Political Publishing House, Hanoi.

Prime Minister of the Government of Vietnam, 1999. Circular on Management of State Funds for the National Five Million Hectares Reforestation Programme. Decision 28/199/TT-BTC. National Political Publishing House, Hanoi.

Prime Minister of the Government of Vietnam, 2007a. On the issuance of the Production Forest Development Policy. The period from 2007 - 2020. Official Gazette, Hanoi.

Prime Minister of the Government of Vietnam, 2007b. Viet Nam Forestry Development Strategy 2006-2020. Hanoi.

Rerkasem, K., 2003. Uplands Land Use. In: Kaosa-ard, M., Dore, J. (Eds.), Social Challenges for the Mekong Region. White Lotus, Bangkok, pp. 323-346.

Rerkasem, K., Rerkasem, B., 1995. Montane Mainland Southeast Asia: Agroecosystems in transition. Global Environmental Change 5, 313-322.

Ribot, J.C., 2002. Democratic Decentralization of Natural Resources, Institutionalizing Popular Participation. World Resources Institute (WRI), Washington DC.

Ribot, J.C., 2003. Democratic Decentralization of Natural Resources: Institutional choice and discretionary power transfers in Sub-Saharan Africa. Public Administration and Development 23, 53-65.

Ribot, J.C., 2004. Waiting for Democracy. The politics of choice in natural resource decentralization. World Resources Institute, Washington DC.

Ribot, J.C., 2006. Editorial. Choose democracy: Environmentalists' socio-political responsibility. Global Environmental Change 16, 115-119.

Ribot, J.C., Agrawal, A., Larson, A.M., 2006. Recentralizing While Decentralizing: How National Governments Reappropriate Forest Resources. World Development 34, 1864-1886.

Ribot, J.C., Larson, A.M., 2007. The Poverty of Forestry Policy: Double standards on an uneven playing field. Sustainability Science 2.

Ribot, J.C., Peluso, N.L., 2003. A Theory of Access. Rural Sociology 68, 153-181.

Ricardo, D., 2002. The Principles of Political Economy and Taxation. Janus Publishing, London.

Robbins, P., 2003. Political Ecology in Political Geography. Political Geography 22, 641-645.

Robbins, P., 2004. Political Ecology. A critical introduction. Blackwell Publishing, Oxford, UK.

Roda, J.-M., Rathi, S.S., 2005. Vietnam facing China's expanding demand for wood pulp : a diagnostic assessment of plantation development, fiber supply, and impacts on natural forests CIRAD, Montpellier, p. 29.

Roe, E., 1991. Development Narratives, or Making the Best of Blueprint Development. World Development 19, 287-300.

Roe, E., 1999. Except-Africa. Remaking development, rethinking power. Transaction Publishers, New Brunswick (NJ) and London.

Rogerson, P.A., 2001. Statistical Methods for Geography. SAGE Publications, London.

Rudel, T.K., 2008. Forest Policy Changes in the Tropics: An emerging research priority. Global Environmental Change 18, 253-255.

Sabatier, P.A., Jenkins-Smith, H.C., 1999. The Advocacy Coalition Framework. An assessment. In: Sabatier, P.A. (Ed.), Theories of the Policy Process. Westview Press, Boulder, Colorado, pp. 117-166.

Sabatier, P.A., Weible, C.M., 2006. The Advocacy Coalition Framework. Innovations and clarifications. In: Sabatier, P.A. (Ed.), Theories of the Policy Process. Westview Press, Boulder, Colorado, pp. 189-220.

Sayer, A.R., 1992. Method in Social Science: a realist approach. Routledge, London.

Sayre, N.F., 2005. Ecological and Geographical Scale: Parallels and potential for integration. Progress in Human Geography 29, 276-290

Scharpf, F.W., 1997. Games Real Actors Play. Actor-centered institutionalism in policy research. Westview Press, Oxford.

Schlager, E., 1999. Frameworks, Theories and Models. In: Sabatier, P.A. (Ed.), Theories of the Policy Process. Westview Press, Boulder, Colorado, pp. 233-260.

Schlager, E., Ostrom, E., 1992. Property-rights Regimes and Natural Resources: A conceptual analysis. Land Economics 68, 249.

Schluter, A., 2007. Institutional Change in the Forestry Sector--The explanatory potential of New Institutional Economics. Forest Policy and Economics 9, 1090-1099.

Schweik, C.M., 2000. Optimal Foraging, Institutions, and Forest Change: A Case from Nepal. In: Gibson, C.C., McKean, M.A., Ostrom, E. (Eds.), People and Forests: Communities, Institutions, and Governance. MIT Press, Cambridge, Mass., pp. 99–134.

Scott, S., Miller, F., Lloyd, K., 2006. Doing Fieldwork in Development Geography: Research Culture and Research Spaces in Vietnam. Geographical Research 44, 28-40.

Searle, J., 1995. The Construction of Social Reality. Free Press, New York.

Searle, J.R., 2005. What is an Institution? Journal of Institutional Economics 1, 1-22.

Serneels, S., Lambin, E.F., 2001. Proximate Causes of Land-use Change in Narok district, Kenya: A spatial statistical model. Agriculture, Ecosystems & Environment 85, 65-81.

Sewell, W.H., Jr., 1985. Ideologies and Social Revolutions: Reflections on the French Case. The Journal of Modern History 57, 57-85.

Shackleton, S., Campbell, B., Wollenberg, E., Edmunds, D., 2002. Devolution and Community-Based Natural Resource Management: Creating space for local people to participate and benefit? ODI Natural Resource Perspectives 76, 1-6.

Shanks, E., Luttrell, C., Conway, T., Vu Manh Loi, Ladinsky, J., 2004. Understanding the Pro-poor Political Change: The policy process. Vietnam. Overseas Development Institute (ODI), London.

Sharma, E., Kerkhoff, E., 2006. Debating Shifting Cultivation in the Eastern Himalayas: Farmers' innovations as lessons for policy International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal.

Sikor, T., 1998. Forest Policy Reform: From state to household forestry. In: Poffenberger, M. (Ed.), Stewards of Vietnam's upland forests. Asia Forest Network, pp. 18-37.

Sikor, T., 2001. The Allocation of Forestry Land in Vietnam: Did it cause the expansion of forests in the northwest? Forest Policy and Economics 2, 1-11.

Sikor, T., 2004. Local Government in the Exercise of State Power: The Politics of Land Allocation in Black Thai Villages. In: Kerkvliet, B.J.T., Marr, D. (Eds.), Beyond Hanoi: Local Government in Vietnam. Institute for Southeast Asian Studies (ISEAS) Publications and NIAS Press, Copenhagen and Singapore, pp. 171-200.

Sikor, T., Tran Ngoc Thanh, 2007. Exclusive versus Inclusive Devolution in Forest Management. Insights from forest land allocation in Vietnam's central highlands. Land Use Policy 24, 644-653.

Simitzis, J., Karagiannis, K., Zoumpoulakis, L., Escobar, A., 1996. Construction nature: Elements for a post-structuralist political ecology. Futures 28, 325-343.

Smith, B.C., 1985. Decentralization: The Territorial Dimension of the State. George Allen, London.

Song, C., Woodcock, C.E., 2003. Monitoring Forest Succession with Multitemporal Landsat Images: Factors of uncertainty. IEEE Transactions on Geoscience and Remote Sensing 41, 2557-2567.

Sowerwine, J., 2004. Territorialisation and the Politics of Highland Landscapes in Vietnam: Negotiating property relations in policy, meaning and practice. Conservation and Society 2, 97-136.

Sproule-Jones, M., 1999. Restoring the Great Lakes: Institutional Analysis and Design. Coastal Management 27, 291-316.

Stocking, M.A., Murnaghan, N., 2001. Handbook for the Field Assessment of Land Degradation. Earthscan Publications Ltd, London.

Stott, P., Sullivan, S. (Eds.), 2000. Political Ecology. Science, myth and power. Arnold, London.

Sunderlin, W.D., Huynh Thu Ba, 2005. Poverty Alleviation and Forests in Vietnam. Center for International Forestry Research (CIFOR), Bogor, Jakarta.

Swinkels, R., Turck, C., 2004. Poverty and Remote Areas: Evidence from new data and questions for the future. Background paper for the PAC Conference. World Bank.

Tacconi, L., 2007. Decentralization, Forests and Livelihoods: Theory and narrative. Global Environmental Change 17, 338-348.

Taylor, B., Kremsater, L., Ellis, R., 1997. Adaptive Management of Forests in British Columbia. British Columbia Ministry of Forests - Forest Practices Branch, Victoria, BC.

The Chairman of the Council of Ministers, 1992. Decision No. 264-CT on Policies Encouraging Investment for Forestry Development. Official Gazette, Hanoi.

Thelen, K., Steinmo, S., 1992. Historical Institutionalism in Comparative Politics. In: Steinmo, S., Thelen, K., Longstreth, F. (Eds.), Structuring Politics: Historical institutionalism in comparative analysis. Cambridge University Press, New York, pp. 1-32.

Thomas, D.S.G., Twyman, C., 2004. Good or Bad Rangeland? Hybrid knowledge, science, and local understandings of vegetation dynamics in the Kalahari. Land Degradation and Development 15, 215-231.

Thomas, F., 1998. *Ecologie et Gestion Forestière dans l'Indochine Française. La Revue Française d'Histoire d'Outre-Mer* 85, 59-86.

Thomson, J.T., 1992. A Framework for Analyzing Institutional Incentives in Community Forestry. Community Forestry Notes. Food and Agriculture Organization of the United Nations (FAO), Rome, p. 130.

Thomson, J.T., Schoonmaker Freudenberger, K., 1997. Crafting Institutional Arrangements for Community Forestry. Community Forestry Field Manual. Food and Agriculture Organization of the United Nations (FAO), Rome, p. 154.

To Xuan Phuc, Sikor, T., 2006. Illegal Timber Logging in Vietnam: Who profits from forest privatization connected with a logging ban? , Survival of the Commons: Mounting challenges and new realities. Eleventh biennial conference of the IASCP (International Association for the Study of Common Property). IASCP (International Association for the Study of Common Property), Ubud, Bali.

Tran Duc Toan, Orange, D., Podwojewski, P., Do Dui Phai, Thai, P., Maugin, J., Pham Van Rinh, 2003. Soil Erosion and Land Use in the Dong Cao Catchment in Northern Vietnam. In: Maglinao, A.R., Valentin, C., Penning de Vries, F. (Eds.), From Soil Research to Land and Water Management: Harmonizing people and nature. Proceedings of IWMI-ADB Project Annual Meeting and 7th MSEC Assembly. IWMI. Southeast Asian Regional Office, Vientiane, Laos.

Tran Duc Toan, Thai Phien, Nguyen L., Do Dui Phai, Ga N.V., 2001. Soil Erosion Management at the Watershed Level for Sustainable Agriculture and Forestry in Vietnam. In: Maglinao, A.R., Leslie, R.N. (Eds.), Soil Erosion Management Research in Asian Catchments: Methodological approaches and initial results - Proceedings of the 5th Management of Soil Erosion Consortium (MSEC) Assembly. IWMI. Southeast Asian Regional Office, Thailand, pp. 233-252.

Tran Duc Vien, 2003. Culture, Environment, and Farming Systems in Vietnam's Northern Mountain Region. Southeast Asian Studies 41, 180-205.

Tran Duc Vien, Nguyen Vinh Quang, Mai Van Thanh, 2005. Decentralization of Forest Management and Impacts on Livelihoods of Ethnic Minority Groups in Vietnam's Uplands: A study on decentralization process in forest management in northern and north central uplands of Vietnam. The Agricultural Publishing House, Hanoi.

Tran Duc Vien, Rambo, A.T., 2001. Social Organization. In: Le Trong Cuc, Rambo, A.T. (Eds.), Bright Peaks, Dark Valleys. A comparative analysis of environmental and social conditions and development trends in five communities in northern Vietnam's northern mountain region. The National Political Publishing House, Hanoi, pp. 177-208.

Tran Ngoc Thanh, Sikor, T., 2006. From Legal Acts to Actual Powers: Devolution and property rights in the Central Highlands of Vietnam. Forest Policy and Economics 8, 397-408.

Transparency International, 2006. Annual Report. In: Poroznuk, A. (Ed.). Transparency International, Berlin.

Tucker, C., Randolph, J., Castellanos, E., 2007. Institutions, Biophysical Factors and History: An integrative analysis of private and common property forests in Guatemala and Honduras. Human Ecology 35, 259-274.

UN (United Nations), 1987. Report of the World Commission on Environment and Development. General Assembly Resolution 42/187, 96th plenary meeting. UN, New York.

UNCED (United Nations Conference on Environment and Development), 1992. Agenda 21 and the UNCED proceedings. In: Robinson, N.A., Hassan, P., Burhenne-Guikmin, F., Under the auspices of The Commission on Environmental Law of the World Conservation Union - The International Union for the Conservation of Nature and Natural Resources (IUCN) (Eds.), Third series, International Protection of the Environment. Oceania Publications, New York, London and Rome.

UNDP (United Nations Development Programme), 1999. Strengthening Representative Bodies with Focus on Provincial People's Council in Vietnam. Project Document. UNDP, Hanoi.

UNDP (United Nations Development Programme), 2001. National Human Development Report 2001. Doi Moi and Human Development in Vietnam. In: UNDP (Ed.). The Political Publishing House, Hanoi.

University of Newcastle upon Tyne, Free University of Amsterdam, UK Department for International Development (DFID), 2005. From the Mountain to the Tap: How land use and water management can work for the rural poor In: UK Department for International Development (DFID) (Ed.).

van Dijk, T.A., 2001. Discourse, Ideology and Context. Folia Linguistica 35, 11-40.

Vasavakul, T., 2003. From Fence-Breaking to Networking: Interests, popular organisations and policy influences in post-socialist Vietnam. In: Kerkvliet, B.J.T., Heng, R.H.K., Koh, D.W.H. (Eds.), Getting Organised in VIetnam. Moving in and around the socialist state. Institute of Southeast Asian Studies, Singapore, pp. 25 - 61.

Vietnam News Source, 2005. International Partners Assist Forestry Sector. Vietnam News, Hanoi.

Vo Quy, 1996. The Environmental Challenges of Vietnam's Development. Draft report. Regional Seminar on Environmental Education, 19-22 March 1996. Center for Natural Resources and Environmental Studies - University of Hanoi, Hanoi, Việt Nam, pp. 4–20.

von Thünen, J.H., 1966. Isolated State: An English version of Der Isolierte Staat. Pergamon Press, Oxford.

Walker, A., 2002. Forests and water in Northern Thailand. Technical Report Working paper no.37. Resource Management in Asia-Pacific (RMAP) Program, Australian National University, Canberra, Australia, p. 30.

Wardell, A.D., Lund, C., 2006. Governing Access to Forests in Northern Ghana: Micro-politics and the rent of non-enforcement. World Development 34, 1887-1906.

Wescott, C.G., 2003. Hierarchies, Networks, and Local Government in Viet Nam. International Public Management Review 4, 20-40.

Weyerhaeuser, H., Wilkes, A., Kahrl, F., 2005. Local Impacts and Responses to Regional Forest Conservation and Rehabilitation Programs in China's Northwest Yunnan Province. Agricultural Systems 85, 234-253.

Wheeler, D., Tiefelsdorf, M., 2005. Multicollinearity and Correlation among Local Regression Coefficients in Geographically Weighted Regression. Journal of Geographical Systems 7, 161-187.

WHO (World Health Organisation), 2003. Health and Ethnic Minorities in Viet Nam. Technical Series. WHO, Hanoi.

Wilson, J., 2002. Scientific Uncertainty, Complex Systems, and the Design of Common-Pool Institutions. In: Committee on the Human Dimensions of Global Change, Ostrom, E., Dietz, T., Dolšak, N., Stern, P.C., Stovich, S., Weber, E.U. (Eds.), The Drama of the Commons. National Academy Press, Washington, DC, pp. 327-359.

Wong, T., Delang, C.O., Schmidt-Vogt, D., 2007. What is a Forest? Competing meaning and the politics of forest classification in Thung Yai Naresuan wildlife sanctuary, Thailand. Geoforum 38, 643-654.

Woods, L.S., 2002. Vietnam: A global studies handbook. ABC-Clio, Santa Barbara, Calif.

World Bank, 1995a. Viet Nam. Environmental Programme and Policy Priorities for a Socialist Economy in Transition. World Bank. Agriculture and Environment Operations Division, Washington, DC.

World Bank, 1995b. Viet Nam. Environmental Programme and Policy Priorities for a Socialist Economy in Transition. World Bank. Agriculture and Environment Operations Division, Washington, DC.

World Bank, 2002. Sustaining Forests. A Development Strategy. World Bank, Washington, DC.

World Bank, 2006. From Plan to Action: Achieving SEDP targets. Vietnam Partnership Report 2006. An informal report prepared for the Consultative Group Meeting for Vietnam. Hanoi, December 14-15, 2006. World Bank, Hanoi.

World Bank, Asian Development Bank (ADB), Canadian International Development Agency (CIDA), Danish International Development Agency (DANIDA), UK Department for International Development (DFID), Netherlands Ministry for Development Cooperation (NMDC), Norwegian Agency for Development Cooperation (NORAD), Swedish International Development Agency (SIDA), Swiss Agency for Development and Cooperation (SDC), United Nations Development Programme (UNDP), 2004. Vietnam Development Report 2005: Governance. Hanoi.

Young, O.R., Lambin, E.F., Alcock, F., Haberl, H., Karlsson, S.I., McConnell, W.J., Myint, T., Pahl-Wostl, C., Polsky, C., Ramakrishnan, P., Schroeder, H., Scouvart, M., Verburg, P.H., 2006. A Portfolio Approach to Analyzing Complex Human-environment Interactions: Institutions and land change. Ecology and Society 11, 31.

Zimmerer, K.S., 1996. Discourses on Soil Loss in Bolivia. Sustainability and the search for socioenvironmental "middle ground". In: Watts, M., Peet, R. (Eds.), Liberation Ecologies: Environment, development and social movements. Routledge, London, pp. 110-124.

Zingerli, C., 2003. Vietnam's Mountain Problematique: Debating development, policy and politics in mountain areas. Ph.D. diss. East Anglia, Norwich.

Zingerli, C., 2005. Colliding Understandings of Biodiversity Conservation in Vietnam: Global claims, national interests and local struggles. Society and Natural Resources 18, 733-747.

List of annexes

Annex A. Research presentations and dissemination of findings

Oral presentations at international conferences

International conference, Mainland Mountain Southeast Asia (MMSEA) IV
16-19th May 2005, Sa Pa, Vietnam
Paper presentation. Clement, F, Nguyen Duy Phuong, Orange D., Calder I.R., Amezaga J.M., Large A.R.G. *Scientific narratives and policy: the need for a pragmatic approach regarding land management in Vietnam*

International Symposium "Towards Sustainable Livelihoods and Ecosystems in Mountainous Regions"
7-9th March 2006, Chiang Mai, Thailand
Paper presentation. Clement F., Amezaga J.M., Orange D., Tran Duc Toan, Large A.R.G, Calder I.R. *Reforestation Policies and Upland Allocation in Northern Vietnam: An institutional approach for understanding farmer strategies and land use change.*

11th biennal Conference of the International Association of the Study of Common Property "Survival of the Commons: Mounting challenges and new realities"
19-23rd June 2006, Ubud, Bali, Indonesia
Paper presentation. Clement F., Amezaga J.M., Orange D., Tran Duc Toan, Large A.R.G, Calder I.R. *An institutional approach for understanding farmers strategies and land management.*

International conference "Sustainable Sloping Lands and Watershed Management: Linking research to strengthen upland policies and practices"
12-15th December 2006, Luang Prabang, Lao PDR
Paper presentation. Clement, F. *How do farmers make decisions in a land degradation context? A case study from Northern Vietnam*

International conference "Poverty Reduction and Forests: Tenure, Market and Policy Reforms"
3-7th September 2007, Bangkok, Thailand
Poster presentation. Clement, F., Amezaga, J. M., Calder, I. R., Large, A.R.G. and Orange, D. *A multi-level approach to examine the impact of forest policies on land use and poverty in Northern Vietnam.*

12th biennal Conference of the International Association for the Study of Commons "Governing shared resources: connecting local experience to global challenges"
15-18th July 2008, Cheltenham, UK
Paper presentation. Clement F. *Linking decisions on commons management with macro-level policies: Propositions for a revised IAD framework*
Paper presentation. Clement F., Amezaga J.M., Orange D., Large A.R.G, Calder I.R. *Linking reforestation with forest policies: A multi-scale and interdisciplinary methodology applied to Vietnam*

Oral presentations of research findings

MSEC workshop SFRI/IRD
23rd September 2005, Hanoi, Vietnam, 20 participants
Presentation. "*Driving Forces for Land Management in the Northern Uplands of Vietnam: linking environmental change with social explanations*"

Results presentation from the fieldwork in Dong Cao, Dong Dau and Que Vai to the villagers

3-4th October 2005, villages of Dong Cao, Dong Dau and Que Vai, Tien Xuan commune, Hoa Binh province, Vietnam, *c.* 10-15 participants from each village
Presentation. *"Feedback from the research work from June to August 2005"*

MSEC workshop, SFRI /IRD
21st February 2006, Hanoi, Vietnam, *c.* 40 participants
Presentation. *"Driving Forces for Land Management in the Northern Uplands of Vietnam: linking environmental change with social explanations"*

Tropenbos International workshop "Research for improved forest management"
23-24th February 2006, Hue, Vietnam
Poster session. Clément F., Amezaga J.M., Orange D., Tran Duc Toan, Large A.R.G, Calder I.R. (2006). *An institutional analysis for understanding land-use change in Northern Vietnam.*

IPSARD, Rural Development and Natural Resources working group
22nd September 2006, Hanoi, Vietnam, 21 participants
Presentation. *"Reforestation in Northern Vietnam: An accident or a durable phenomenon?"*

Ph.D. school "The Challenge of Self-Governance in Complex, Globalizing Economies: Responding to Walter Eucken's Challenge", Institute of Forestry Economics of the Albert Ludwigs University, Faculty of Economics and Behavioral Sciences and Walter-Eucken Institute
17-26th April 2007, Freiburg, Germany
Paper presentation. Clement, F. (2007) *A multi-scale analysis of institutions, interests and beliefs associated with forest policies. Insights from Northern Vietnam*

Postgraduate research conference, School of Civil Engineering and Geosciences, Newcastle University
30th June 2007, Newcastle upon Tyne, UK, *c.* 40 participants
Presentation. *"Driving forces for reforestation in the Northern uplands of Vietnam: an institutional analysis"*

Workshop "Analysing the gap between policy intentions and outcomes regarding forest policies in Northern Vietnam"
6th October 2007, SFRI, Hanoi, Vietnam, 19 participants
3 presentations:
- *"Understanding reforestation: why local factors matter"*
- *"Analysing the relative impact of state policies on reforestation"*
- *"Identifying drivers for reforestation"*

Newcastle University, Water seminar, School of Civil Engineering and Geosciences,
13th March 2008, Newcastle upon Tyne, UK, 7 participants
Presentation. *"Analysing forest cover change in Northern Vietnam, using GWR"*

To come: **Postgraduate conference, "Interdisciplinary Perspectives on Politics"**, Newcastle University, 24th May 2008, Newcastle upon Tyne, UK
Paper presentation. Clement F. *Reforestation programme and Forest Land Allocation in Vietnam: Analysing gaps between intentions and outcomes.*

Other oral research presentations

Newcastle University and Durham University Geography Departments, Postgraduate student workshop "Geographical imagination"
17th February 2005, Durham University, UK
Presentation. *"Defining indicators for Sustainable Land Management in the northern uplands of Vietnam"*

PAGE MISSING IN ORIGINAL

Annex B. Topics discussed during household interviews. Fieldwork Tien Xuan Commune, Luong Son District, Hoa Binh Province, Vietnam, June - July 2005

This document was used as a frame to guide the interview. Themes were usually discussed in the order presented below, but the order and the nature of the questions within each theme were flexible and adapted to the course of the discussion in order to keep the talk flowing. Interviews always started with an introduction explaining the research scope and aims, and the objectives, proposed duration and course of the interview.

Life story and household characteristics

- Household composition
- Life story since settlement
- Past key events which impacted the household livelihood
- Household resilience and vulnerability to natural disasters; past droughts or storms
- Date of construction of the brick house, source of incomes for the construction
- Education of household members; wishes for children's education
- Current physical capital: TV, motorbike, sofa, agricultural production tools

Activities and natural resources management

- Past and present farm and non-farm activities; evolution of activities and use of natural resources since the settlement; drivers for change; commercialisation of agricultural products; role of household members, repartition of tasks and activities within the household; constraints for activity development
- Lowland
  Size of lowland fields, productivity, land and water management (e.g. use of fertilisers, number of crops/year); evolution of land-use practices; land tenure
- Upland
  History of upland cultivation: land-use change, crop yields, constraints and benefits related to upland cultivation; drivers for land-use change; land tenure; perception of land degradation, of reforestation and forest benefits
- Garden
  Size and use of the garden
- Fish pond
  Size and use of the fish pond
- Husbandry
  Number of cows, buffaloes, pigs, other animals; evolution of husbandry activities. Reasons for change; selling prices of pigs and cattle
  Grazing location and rules.
- Non-farm activities
  Nature of non-farm activities, frequency; proportion of non-farm/total income.
- Other sources of incomes (e.g. off-farm activities)
- Use of other natural resources (non-timber forest products, wild animals, etc).
- Water management
  Water sources; quality and quantity of water
- Incomes and expenses
  Main sources; financial resilience and vulnerability; loans

Health

- Past and current health problems
- Health infrastructure within the commune and the province

Relationships with neighbouring villages and towns

- Frequency and purpose of travels outside the village/the commune

Institutions and organisations

- Rules for water, land and natural resources management in the village
- Mass organisations membership. Perception of the benefits of being involved in these organisations
- Membership in informal groups (e.g. lottery)

Perception of the future

- Perception of the evolution of the village in the next 10 years
- Perception of the evolution of the living conditions in the future
- What should be done to improve living conditions in the future? Perception of the contribution of state policies to improve living conditions
- What are the projects of the household?

Annex C. List of key informants. Fieldwork Tien Xuan Commune, Vietnam, May – July 2005

Governance unit	Name	Position	Date of the interview
Dong Cao	Mr Binh	Village leader	04/06/2005
Dong Cao	Mr Binh	Head of the Youth Union	20/06/2005
Dong Cao	Mr Vui	Head of the Fatherland Front	26/05/2005
Dong Cao	Mr Qui	Head of the War Veterans' Organisation	02/06/2005
Dong Cao	Mr Roi	Secretary of the Village Party Cell	26/05/2005
Dong Cao	Mr Thuong	Head of the Peasants' Association	28/05/2005
Dong Cao	Mrs Bon	Head of the Women's Union	29/05/2005
Dong Cao	Mr Thao	Head of the Elders' Union	04/06/2005
Dong Dau	Mr Chuc	Head of the War Veterans' Organisation	17/07/2005
Dong Dau	Mr Doi	Vice-secretary of the village Party cell	14/07/2005
Dong Dau	Mr Hau	Head of the Youth Union	17/07/2005
Dong Dau	Mr Hung	Village leader	14/07/2005
Dong Dau	Mr Luong	Head of the Elder's Union	15/07/2005
Dong Dau	Mr Nuoi	Secretary of the village Party cell	14/07/2005
Dong Dau	Mr Thanh	Head of the Peasants' Association	16/07/2005
Dong Dau	Mrs Thin	Head of the Women's Union	15/07/2005
Dong Dau	Mrs Tranh	Health assistant	20/07/2005
Que Vai	Mr Chung	Village leader	13/07/2005
Que Vai	Mr Chuong	Head of the Youth Union	16/07/2005
Que Vai	Mrs Dai	Head of the Women's Union	15/07/2005
Que Vai	Mr Hai	Head of the Peasants' Association	14/07/2005
Que Vai	Mr Hien	Secretary of the village Party cell	14/07/2005
Que Vai	Mr Luc	Head of the Fatherland Front	14/07/2005
Que Vai	Mr Qui	Head of the Elders' Union	15/07/2005
Que Vai	Mr Tinh	Head of the Soldiers' Organisation	18/07/2005
Que Vai	Mr Tien	Head of the War Veterans' Organisation	16/07/2005
Tien Xuan Commune	Mr Bon	Agricultural extension officer	27/05/2005
Tien Xuan Commune	Mr Tanh	Officer - Land Tenure Section of the Commune People's Committee	20/062005
Tien Xuan Commune	Mr Tinh	President - Commune People's Committee	22/08/2005
Tien Xuan Commune	Mr Tinh	Officer - Hydraulic and Infrastructure Section of the Commune People's Committee	23/08/2005
Tien Xuan Commune	Mr Dao	Secretary - Commune Party cell	23/08/2005
Tien Xuan Commune	Mr Bon	Vice-President Agriculture and Forestry - Commune's cooperative	02/06/2005
Tien Xuan Commune	Mr Ngoc	Electrician - Commune's cooperative	19/07/2005
Luong Son District	Mr Hien	Head of the Forest Protection Department	18/07/2005

Annex D. Tables on NRM from the focus groups exercises. Que Vai, Fieldwork Tien Xuan Commune, Vietnam, July 2005

The categories presented in the tables of this Annex were defined by the group of participants during the exercise.

Table D-1. Evolution of activities in Que Vai. Table designed by the focus group of young people

	IR†	Future evolution	Past	1989	1993	2001	2002	2004	2005	2006	Future
Pigs	8	+									
Buffalos, cows	10	+									
Chickens	7	=									
Ducks	4	=									
Fish	3	-									
Rice	9	=									
Corn, sweet potatoes	5	=									
Wild bamboo shoots	5	-									
Off-farm work (construction)	7	-									
Merchant of wood and bamboo wood	6	+									
Cassava and arrowroot	/	/									
Sweet bamboo shoots‡	/	+									
Sell land	/	+									
Cultivated bamboo shoots	/	=									

** The cells in grey mean that the activity was said to be practised in the corresponding time period*
† IR: Importance Ranking
‡ Sweet bamboo shoots are a variety of cultivated bamboo shoots.

Table D-2. Activities in Que Vai. Table designed by the focus group of poor farmers

	IR	Future evolution
Rice	10	+
Sweet bamboo shoots	4	+
Cassava	3	-
Pigs	3	+
Chickens	1	+
Buffalos	2	+
Complementary work	1	=
Goats	3	+
Husking machine	4	+
Alcohol production	1	+
Fish pond	2	+

Table D-3. Activities in Que Vai. Table designed by the focus group of average-income farmers

	IR	Evolution in the future
Rice	10	+
Pigs	5	+
Buffalos, cows	10	+
Chickens, ducks	3	+
Trees (eucalyptus)	2	+
Bamboo shoots	4	+
Fruits	2	+
Supplementary work	5	+
Winter crops	6	+
Cassava and arrowroot	1	-
Goats	5	

Table D-4. Activities in Que Vai. Table designed by the focus group of rich farmers

	IR	Evolution in the future
Rice	10	=
Cassava	3	=
Buffalos, cows	12	+
Chickens, ducks	8	+
Pigs	7	+
Eucalyptus, acacias	**6**	+
Supplementary work	4	=
Sell land	5	+
Lottery	/	=

Annex E. Satellite images before and after classification

Figure E-1. Mosaicked and subset image from 2 Landsat TM scenes, December 1993, image colour composite TM bands 3, 2 and 1 providing spectral information equivalent to a natural colour photograph

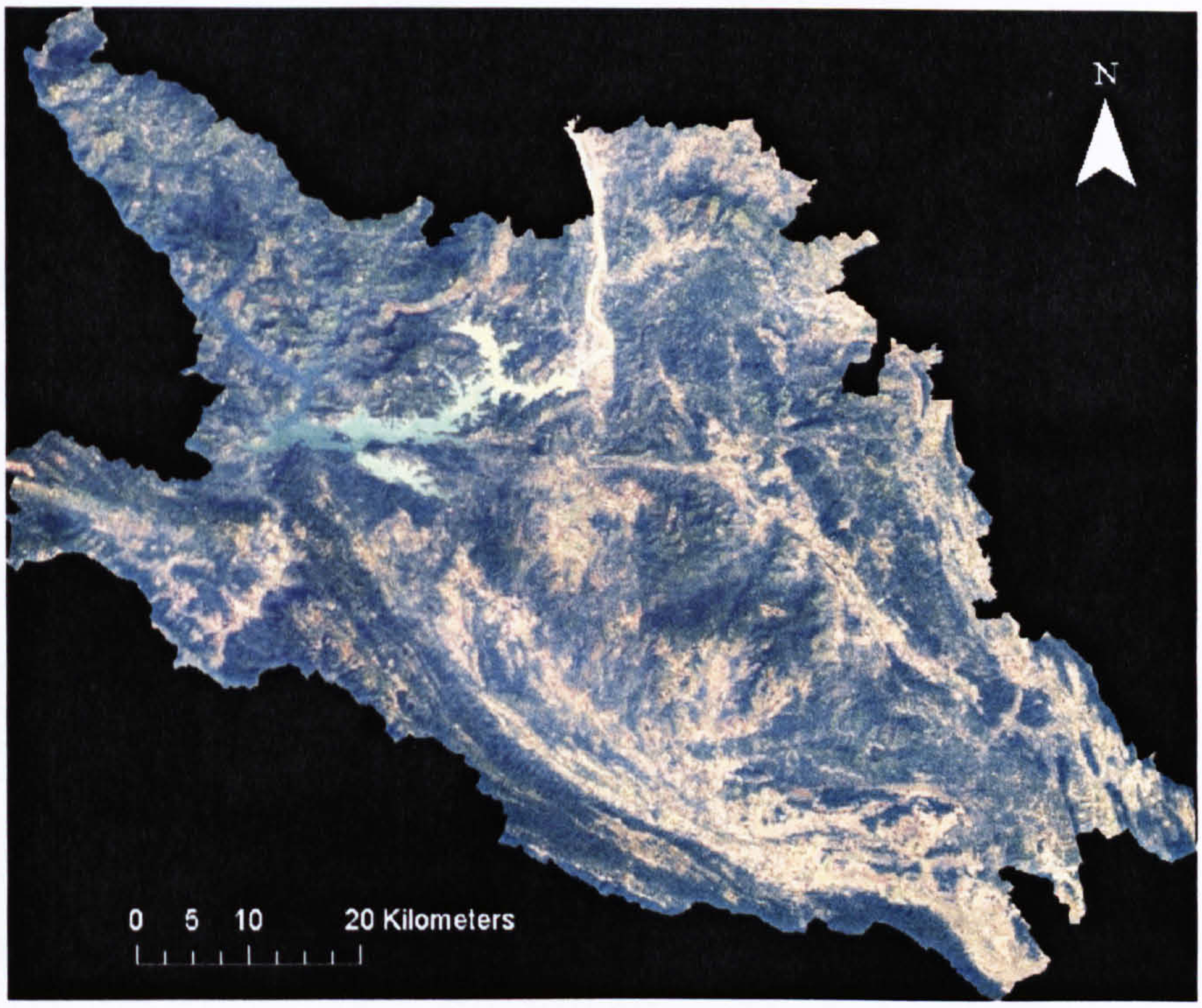


Figure E-2. Mosaicked and subset image from 2 Landsat ETM+ scenes, November 2000, image colour composite ETM bands 3, 2 and 1 providing spectral information equivalent to a natural colour photograph

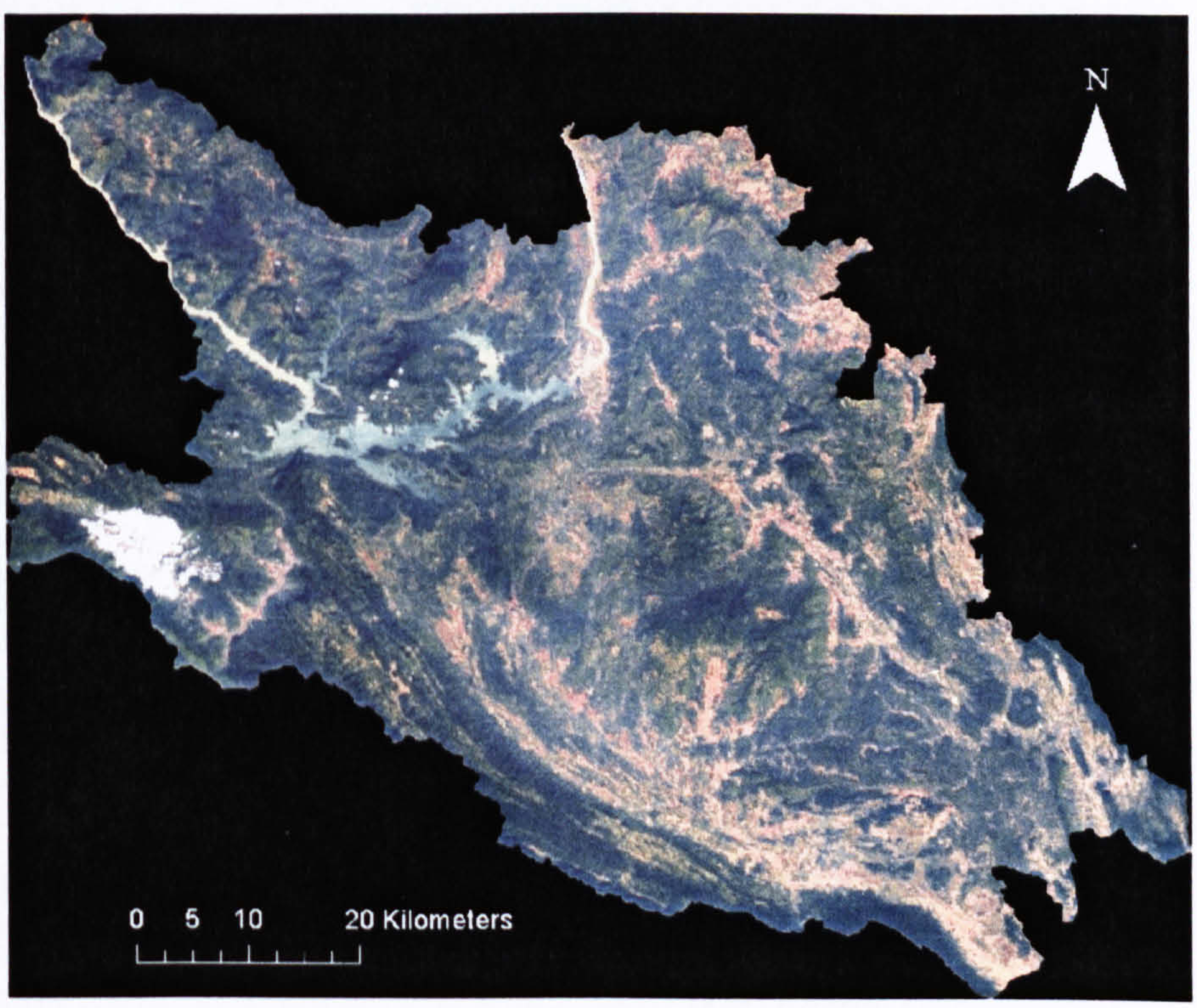
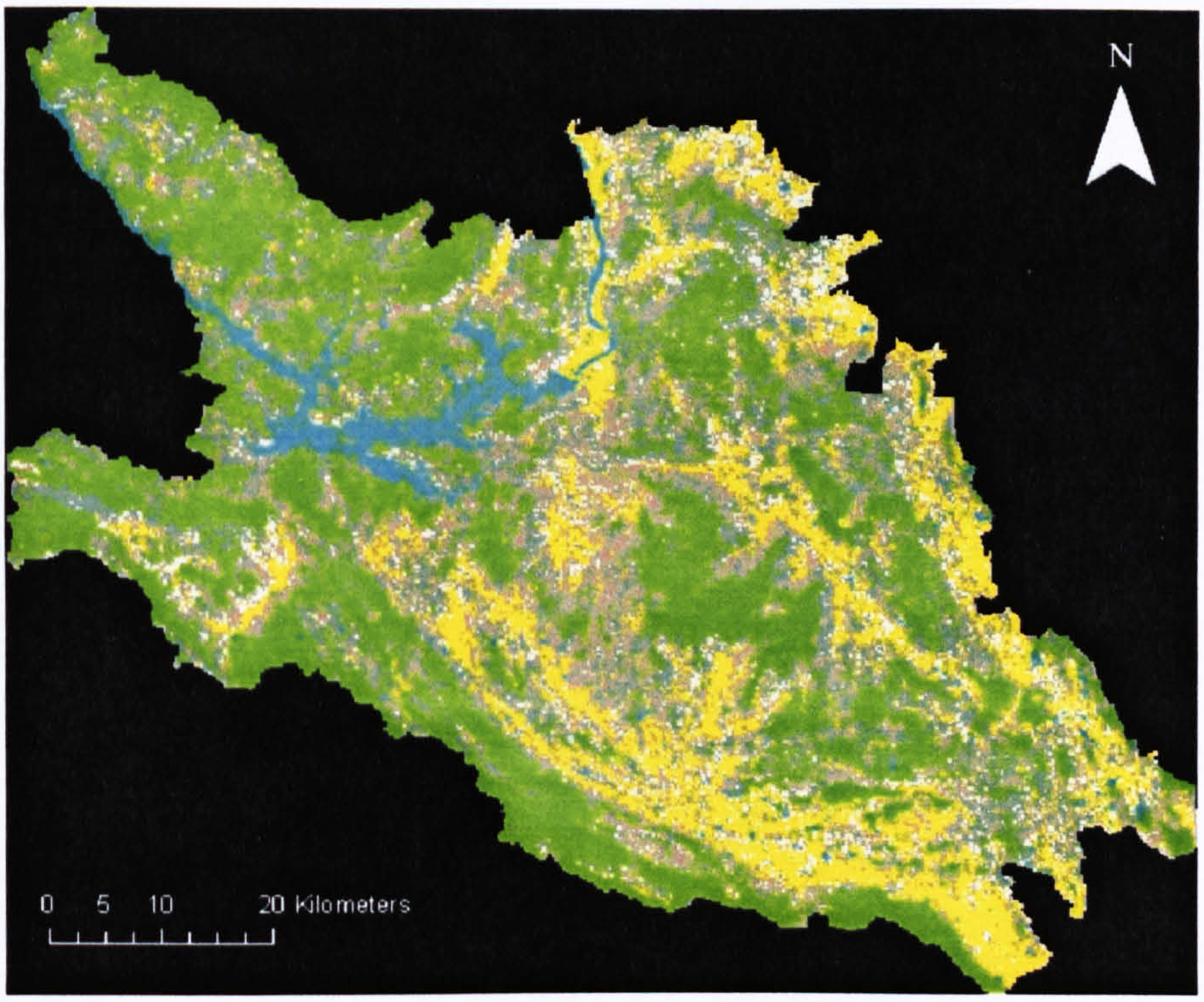
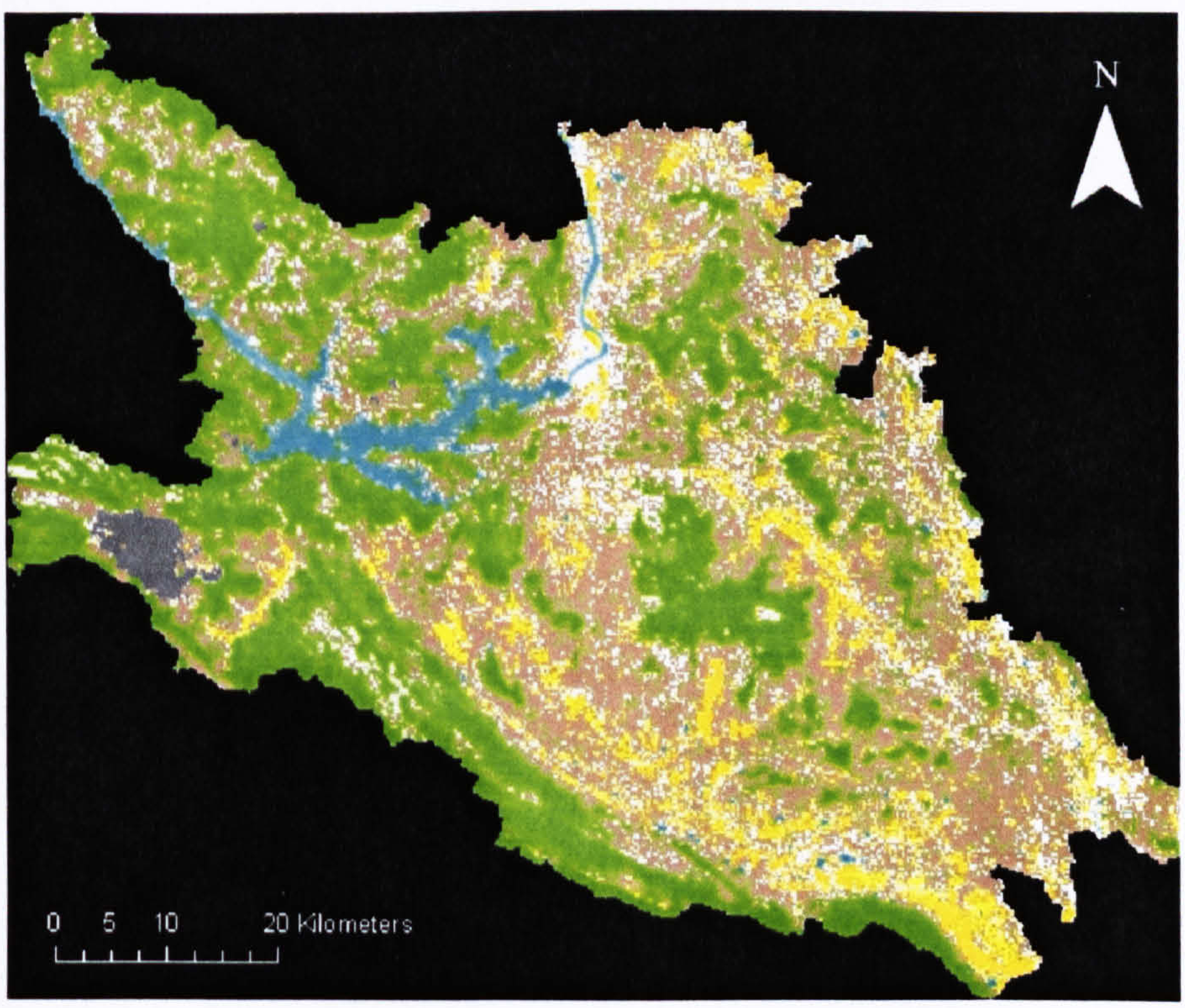


Figure E-3. Classified image December 1993



Land-use classification: blue= water; yellow= lowland; brown= upland shrubs; light green= forest; green olive= upland grass; white= denuded upland

Figure E-4. Classified image November 2000



Land-use classification: blue= water; yellow= lowland; brown= upland grass, crops, and shrubs; green= forest; white= denuded upland and grey= large cloud on the left side of the picture

Annex F. Determination of the area of forestry land in Hoa Binh Province, Vietnam

Table F-1. Comparison of the figures of the area of forestry land from the Hoa Binh FPD and the of land with a slope greater than 5° and with a soil category different than category A, estimated with GIS
The error is the difference between the value given by the FPD and the GIS estimation. It has been rectified for forestry land with the error of the total land area.

District	Total land			Forestry land						
	Area (km²)		Error	Area (km²)			Error			
	FPD 2004	GIS estimation*		FPD 2004	FPD 1999	GIS estimation*	Total 2004	Total 1999	Rectified 2004	Rectified 1999
Hoa Binh	**13.3**	**13.0**	**-0.02**	**7.7**	**8.0**	**8.3**	**0.08**	**0.04**	**0.10**	**0.06**
Da Bac	82.0	82.0	0.00	61.5	66.3	71.1	0.16	0.07	0.16	0.07
Mai Chau	51.9	51.8	0.00	41.1	33.1	42.2	0.02	0.27	0.03	0.28
Tan Lac	52.3	53.3	0.02	38.7	36.6	35.8	-0.08	-0.02	-0.09	-0.04
Lac Son	58.0	58.8	0.01	37.8	38.3		-0.01	-0.02	-0.02	-0.04
Lac Thuy	29.3	28.7	-0.02	20.1	19.6	16.4	-0.19	-0.16	-0.16	-0.14
Yen Thuy	28.2	28.7	0.02	17.3	17.7	15.5	-0.10	-0.12	-0.12	-0.14
Kim Boi	68.1	69.2	0.02	48.4	49.9	49.9	0.03	0.00	0.02	-0.02
Ky Son†	45.6	45.3	-0.01	30.8	30.1	30.7	0.00	0.02	0.01	0.03
Luong Son	37.5	33.4	-0.11	22.8	22.8	20.7	-0.09	-0.09	0.01	0.02
TOTAL	**466.3**	**464.1**	**0.00**	**326.3**	**322.3**	**328.0**	**0.01**	**0.01**	**0.01**	**0.01**

* *Source: Land-use map 1999, Division of Mapping and Ground Measurement of the National Institute of Agricultural Planning and Projection of Vietnam*
† *Figures of 1999 include figures from Cao Phong and Ky Son Districts (which were at this date two distinct districts)*

Annex G. Scatter plots for the dependent and independent variables – Spatial regression analysis of forest cover change in Hoa Binh Province

Scatter plots between the percentage of forest lost and independent variables

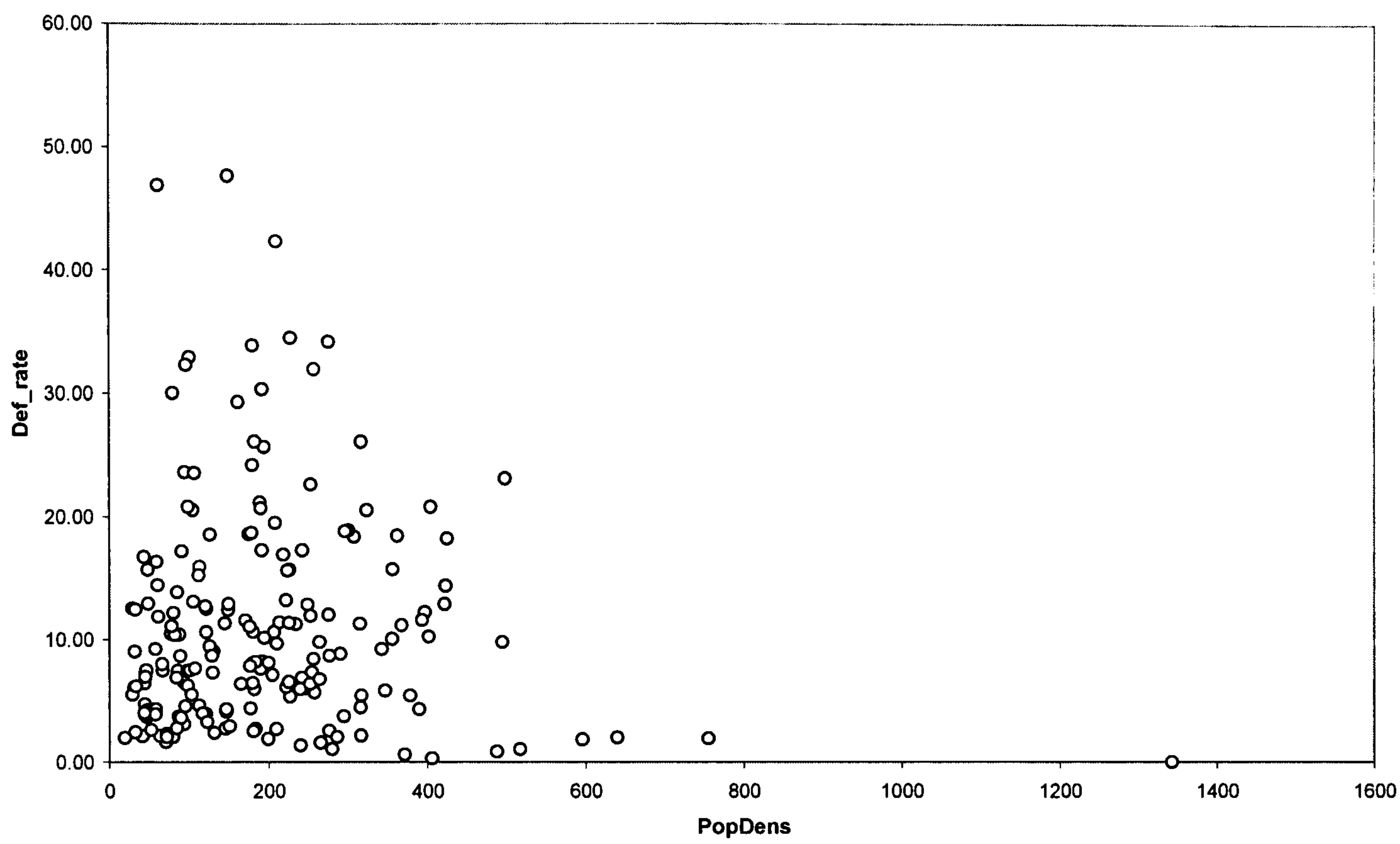


Figure G-1. Scatter plot for the percentage of forest lost and PopDens

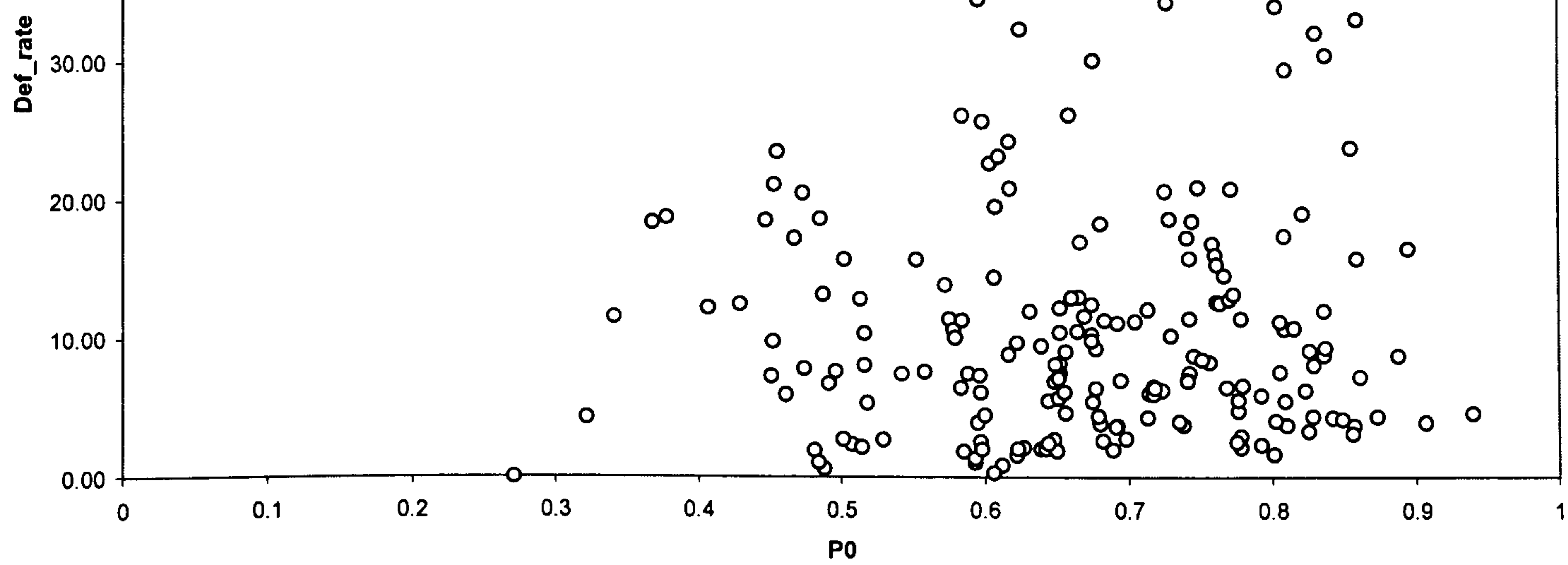


Figure G-2. Scatter plot for the percentage of forest lost and P0

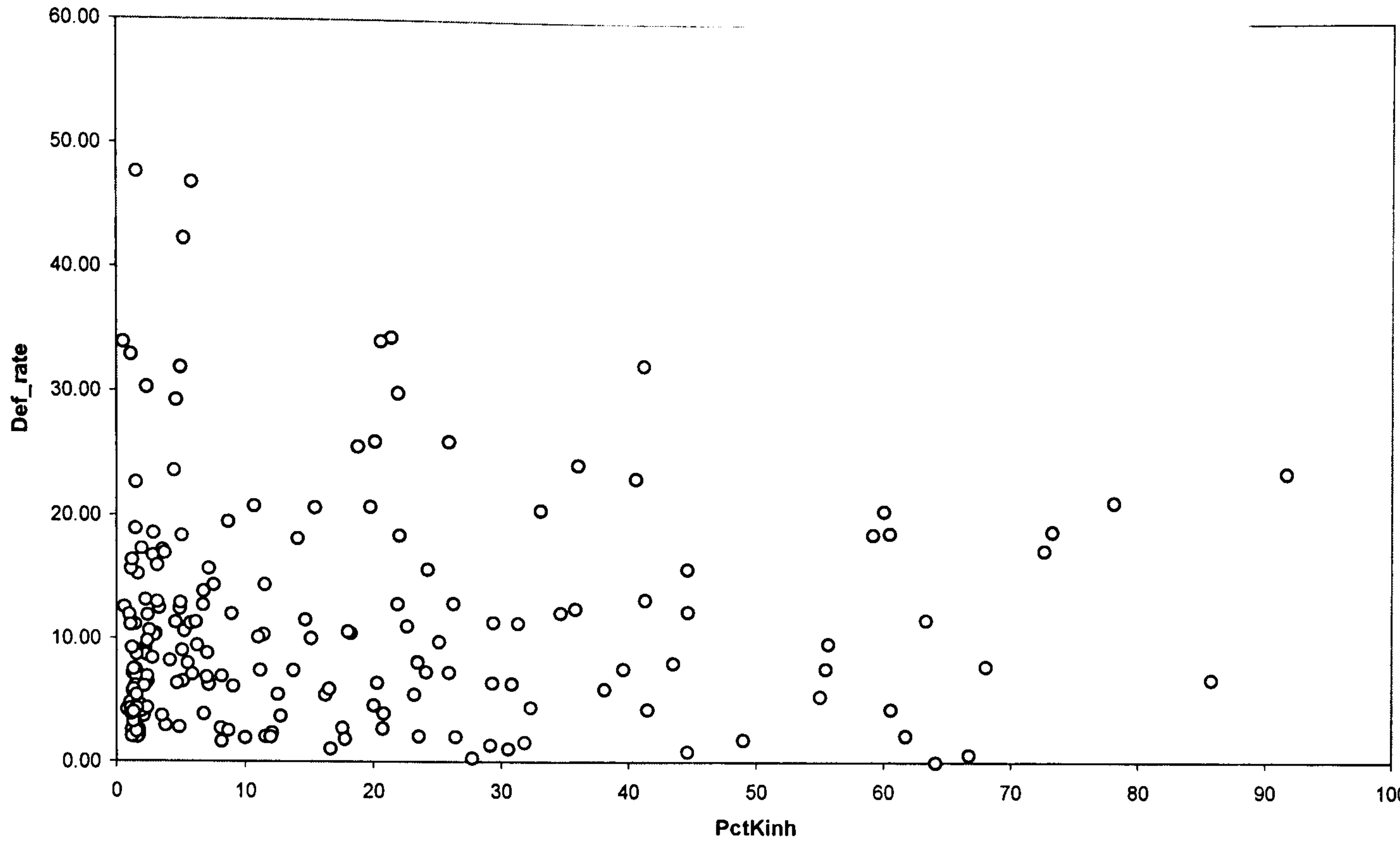


Figure G-3. Scatter plot for the percentage of forest lost and PctKinh

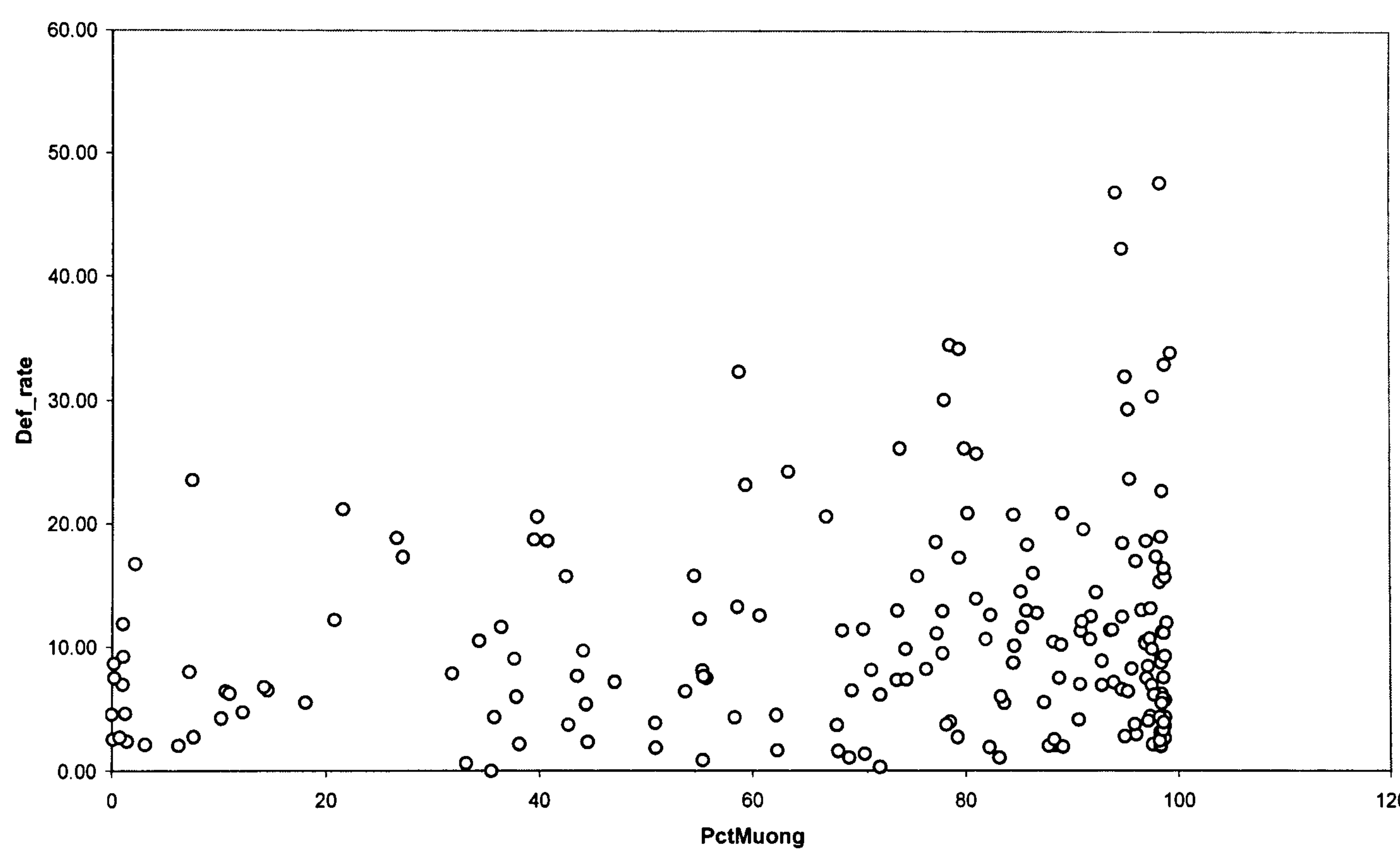


Figure G-4. Scatter plot for the percentage of forest lost and PctMuong

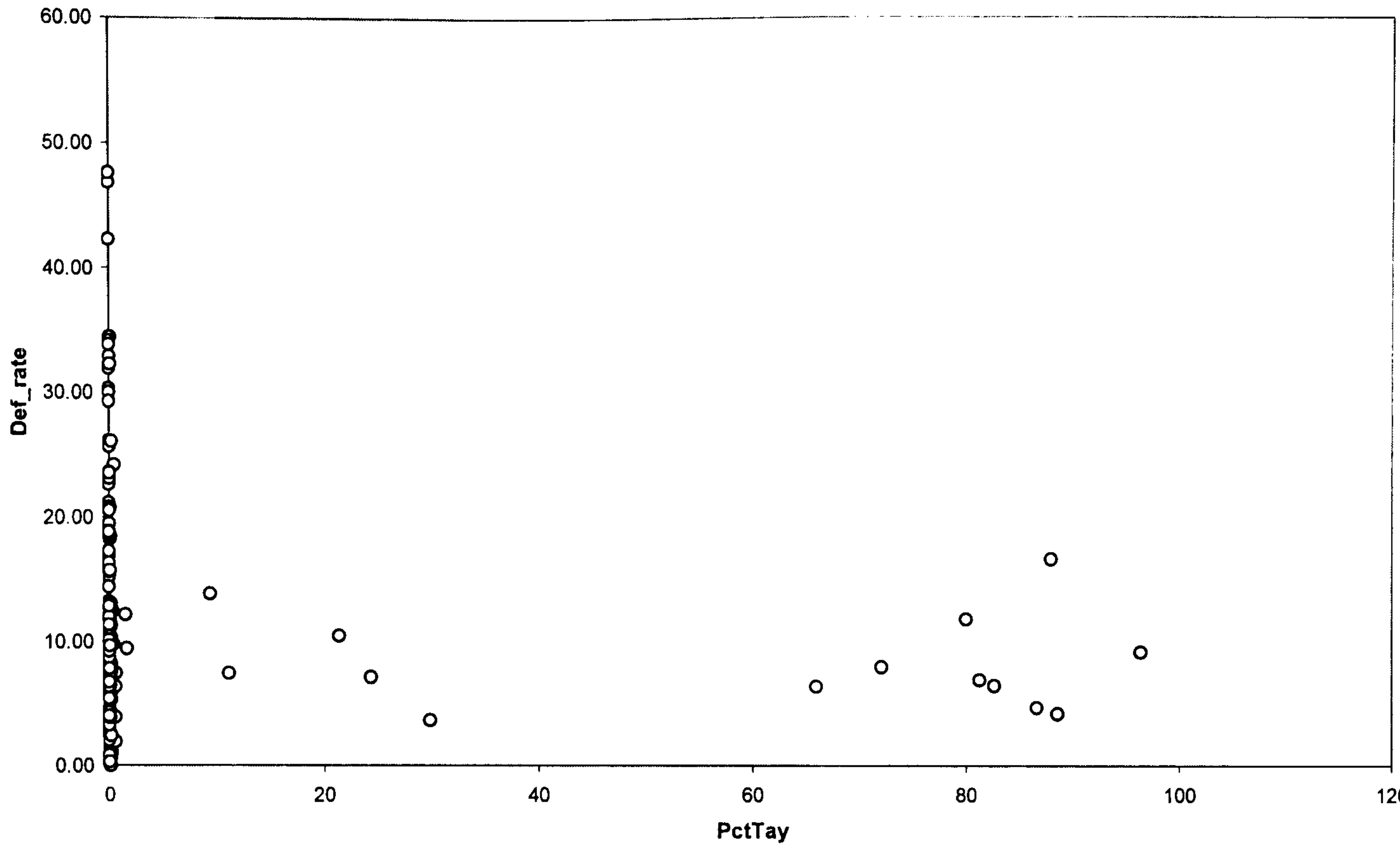


Figure G-5. Scatter plot for the percentage of forest lost and PctTay

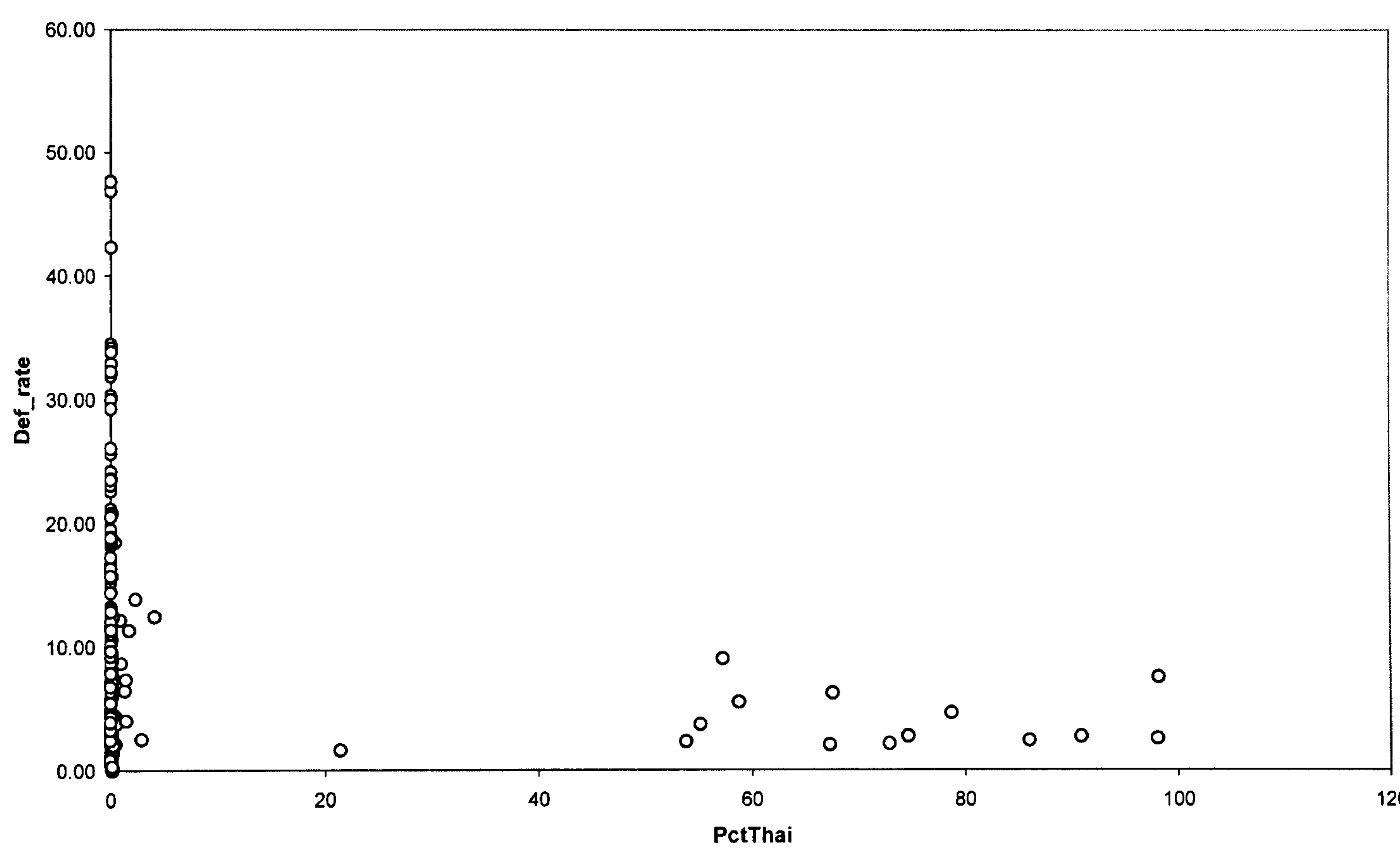


Figure G-6. Scatter plot for the percentage of forest lost and PctThai

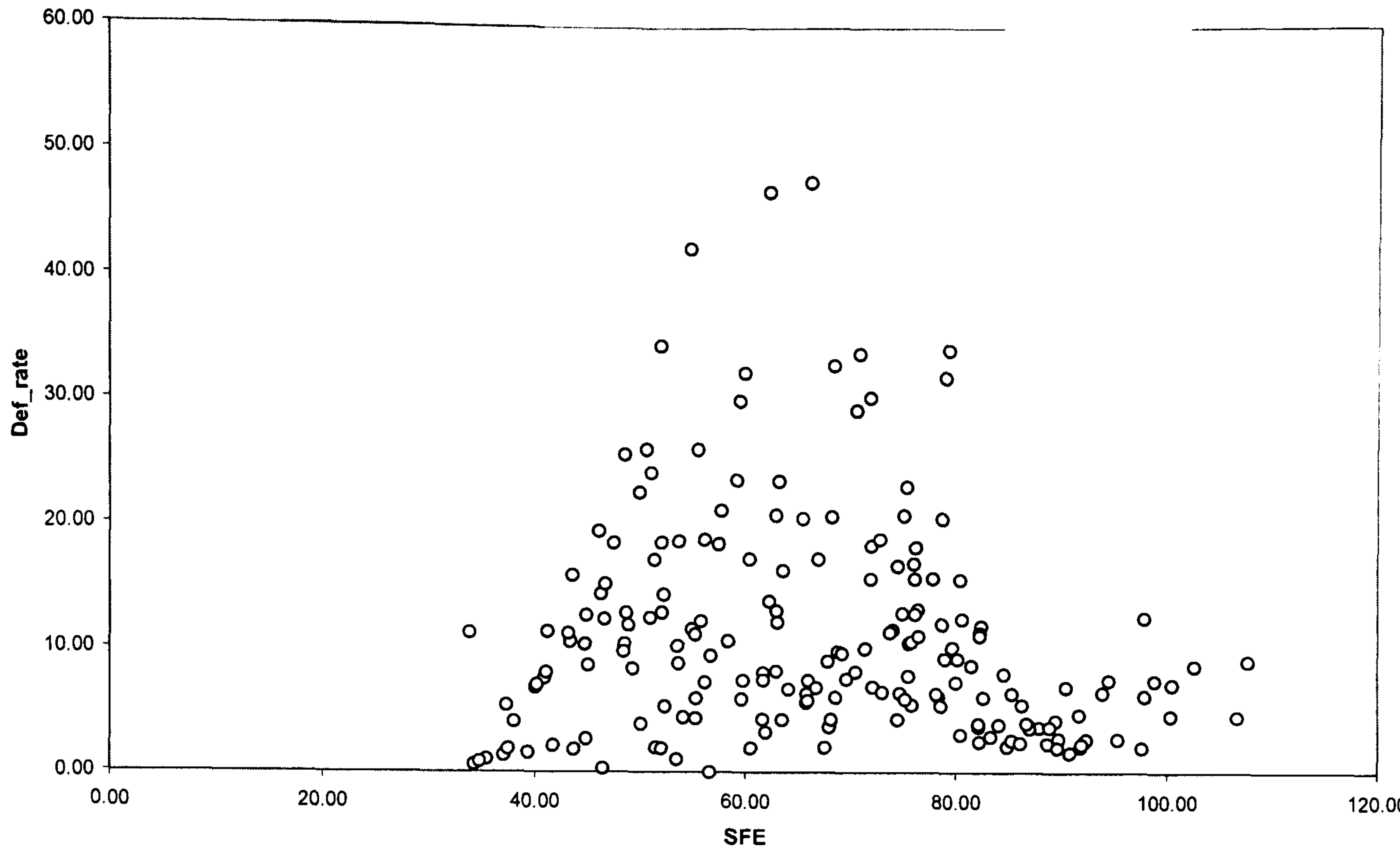


Figure G-7. Scatter plot for the percentage of forest lost and SFE

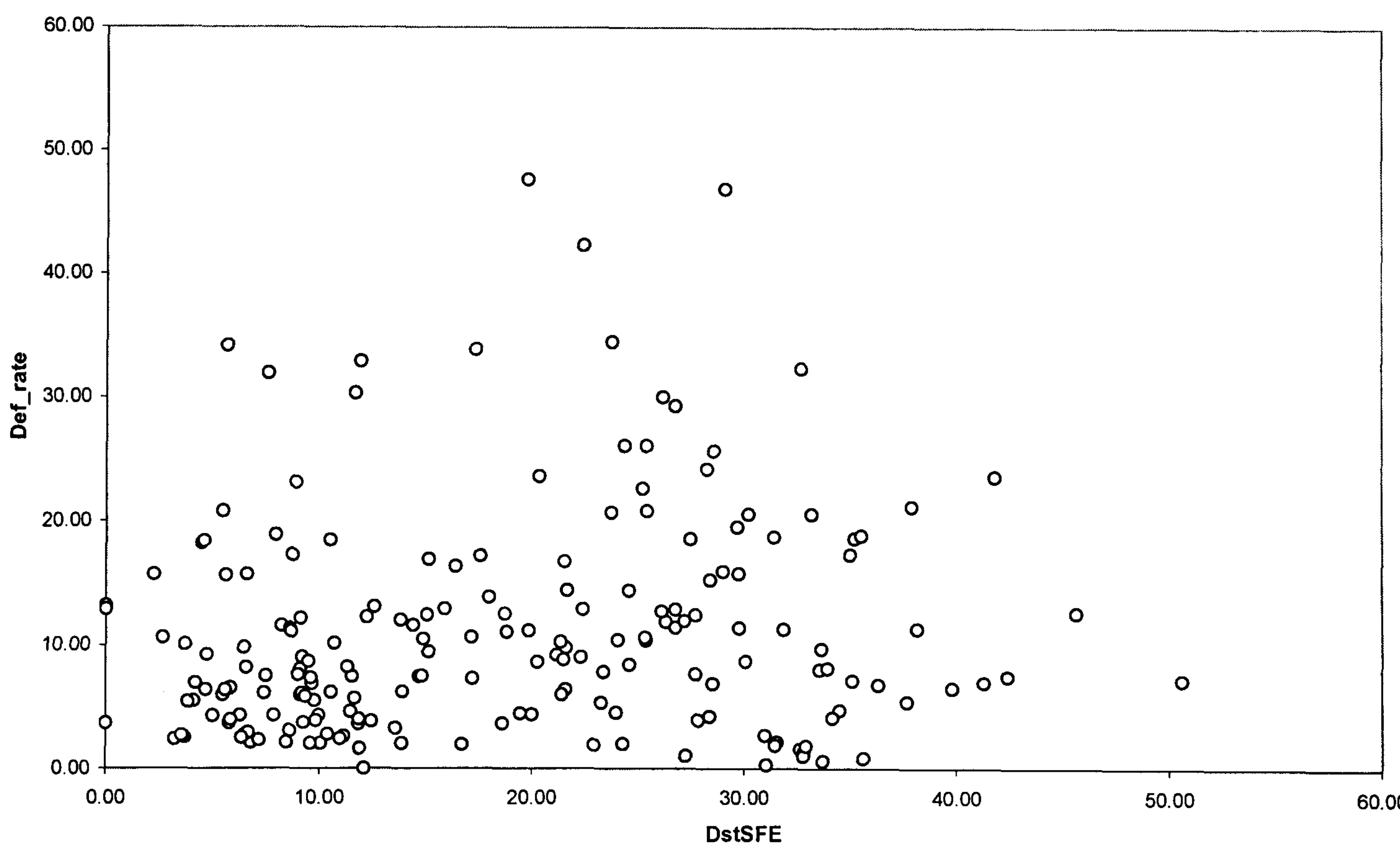


Figure G-8. Scatter plot for the percentage of forest lost and DstSFE

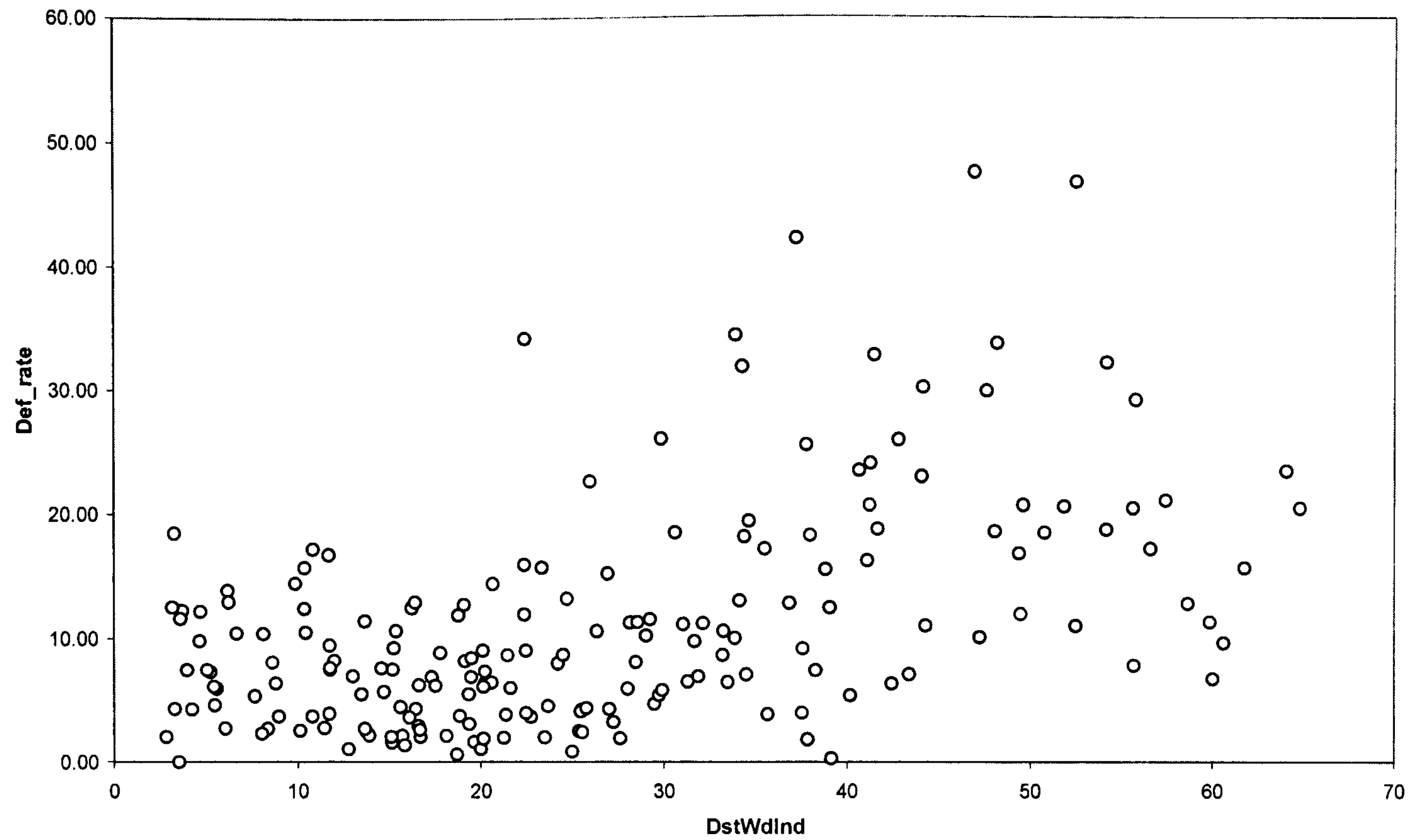


Figure G-9. Scatter plot for the percentage of forest lost and DstWdInd

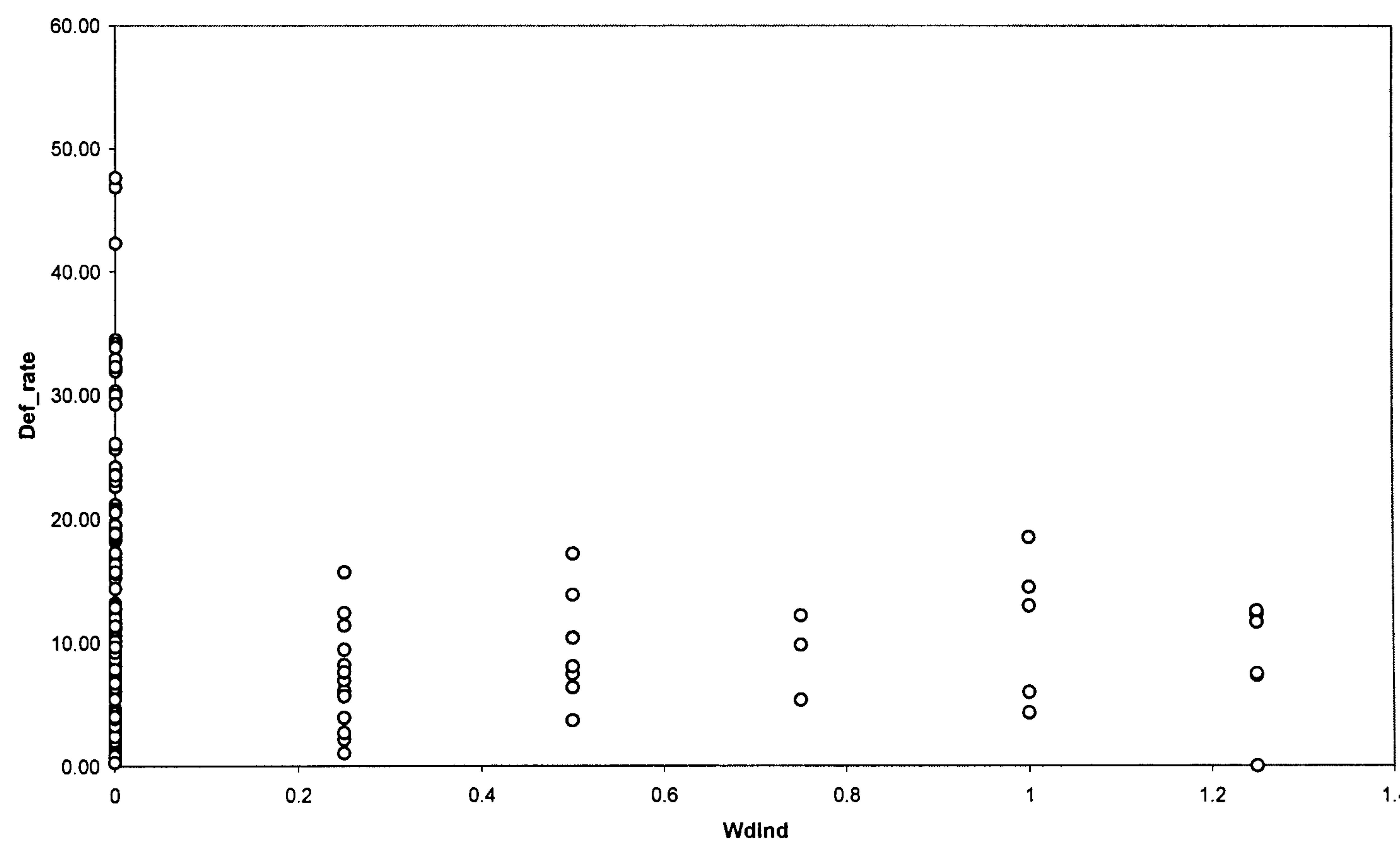


Figure G-10. Scatter plot for the percentage of forest lost and WdInd

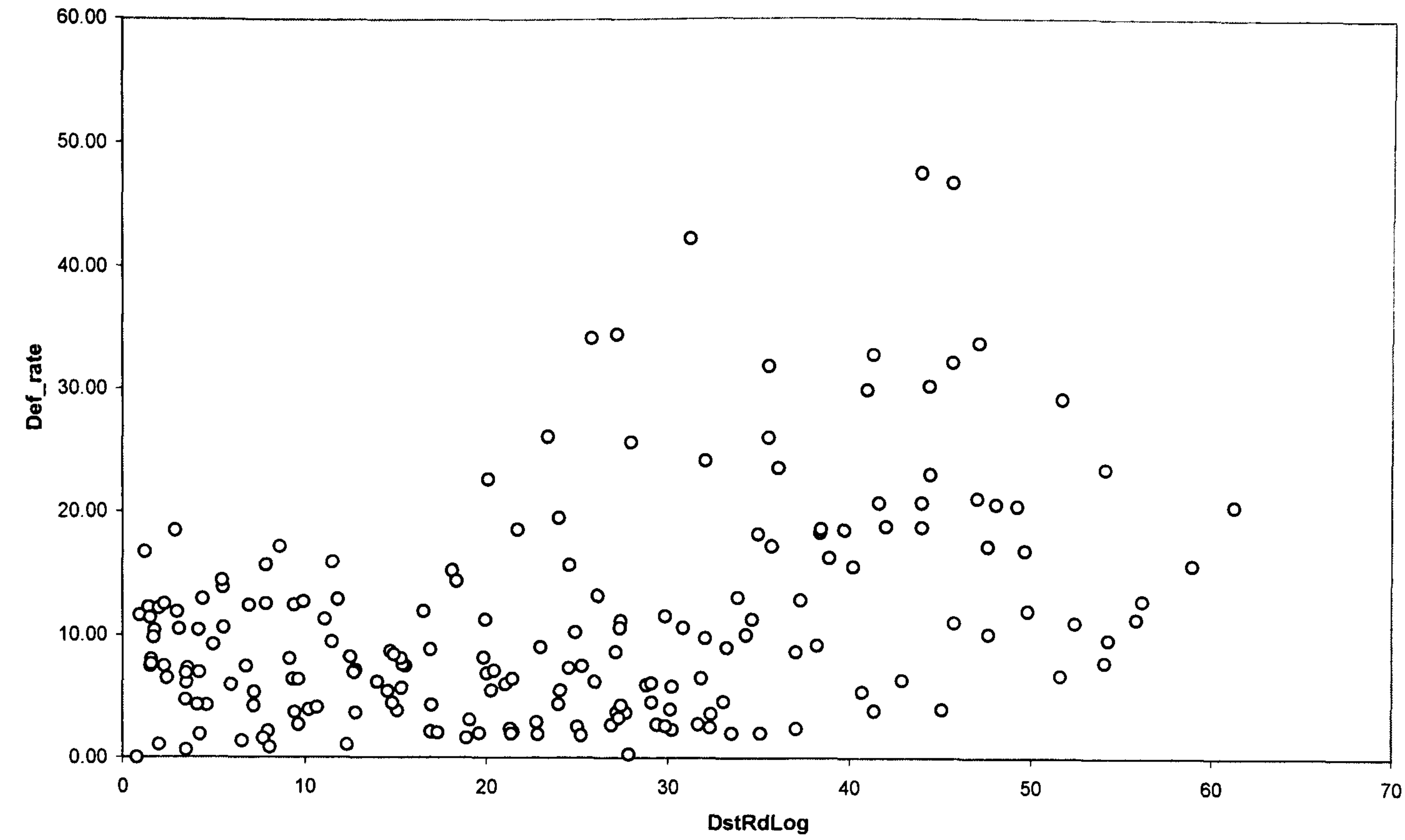


Figure G-11. Scatter plot for the percentage of forest lost and DstRdLog

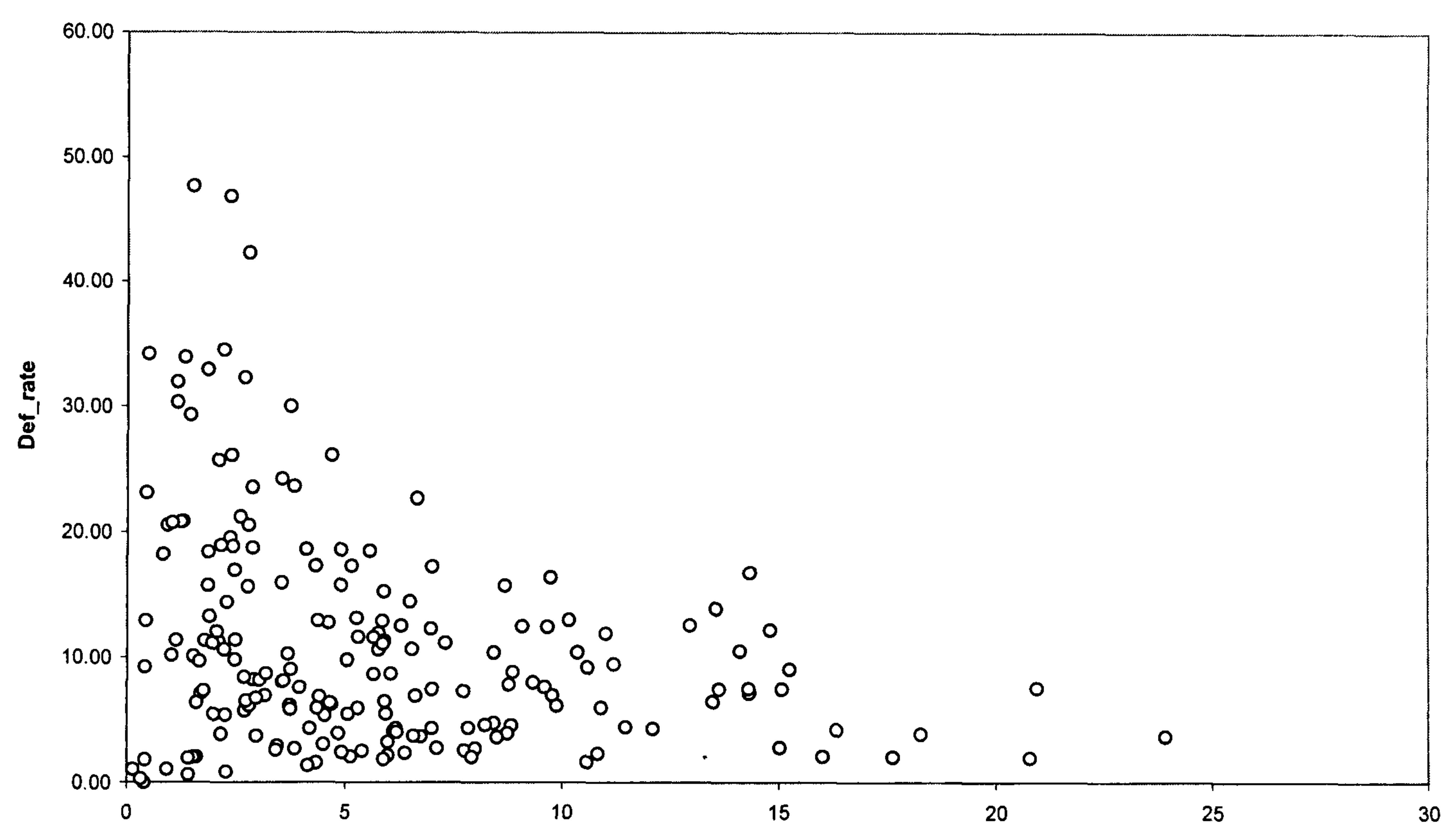


Figure G-12. Scatter plot for the percentage of forest lost and DstAllRd

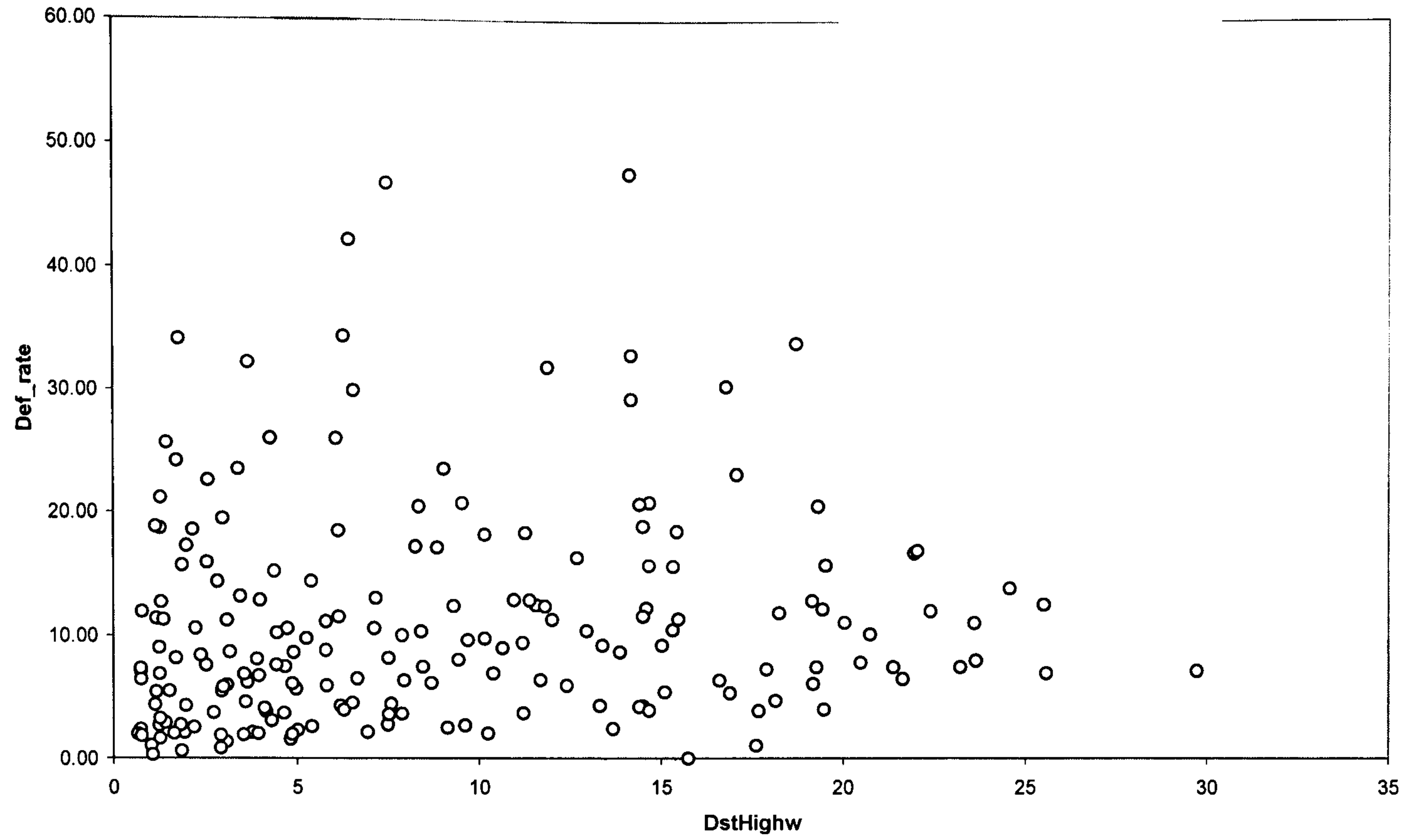


Figure G-13. Scatter plot for the percentage of forest lost and DstHighw

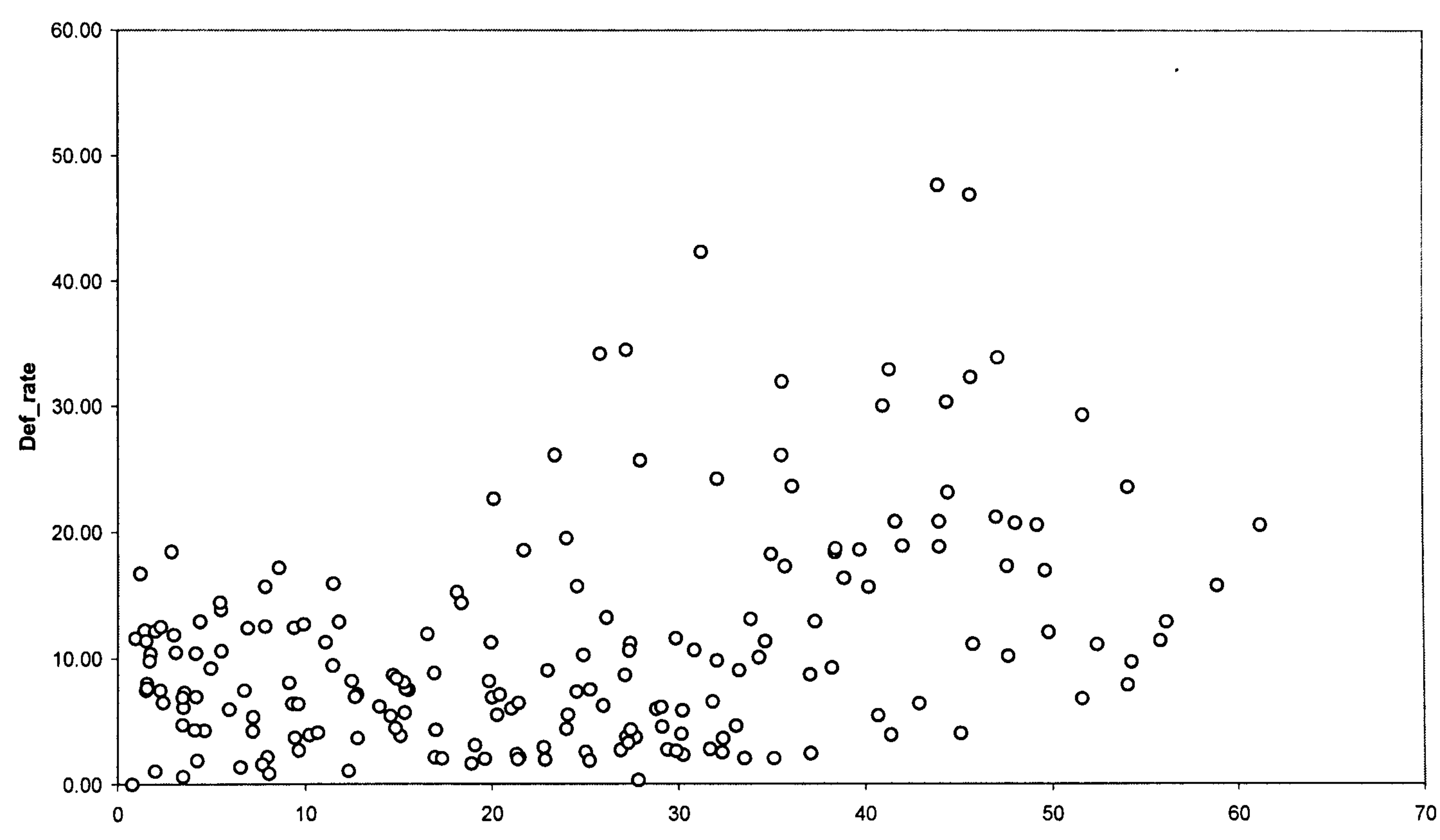


Figure G-14. Scatter plot for the percentage of forest lost and DstMnRd

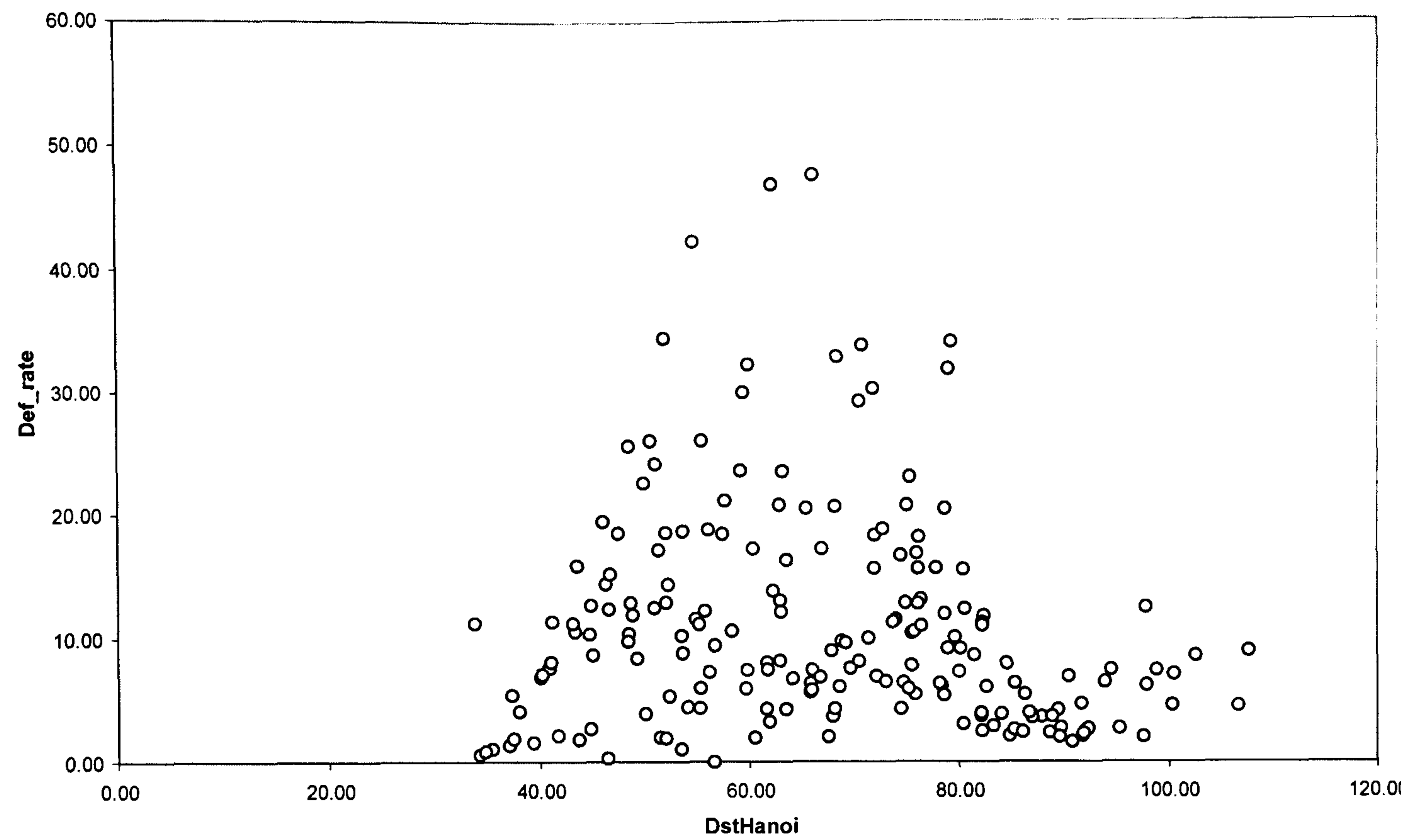


Figure G-15. Scatter plot for the percentage of forest lost and DstHanoi

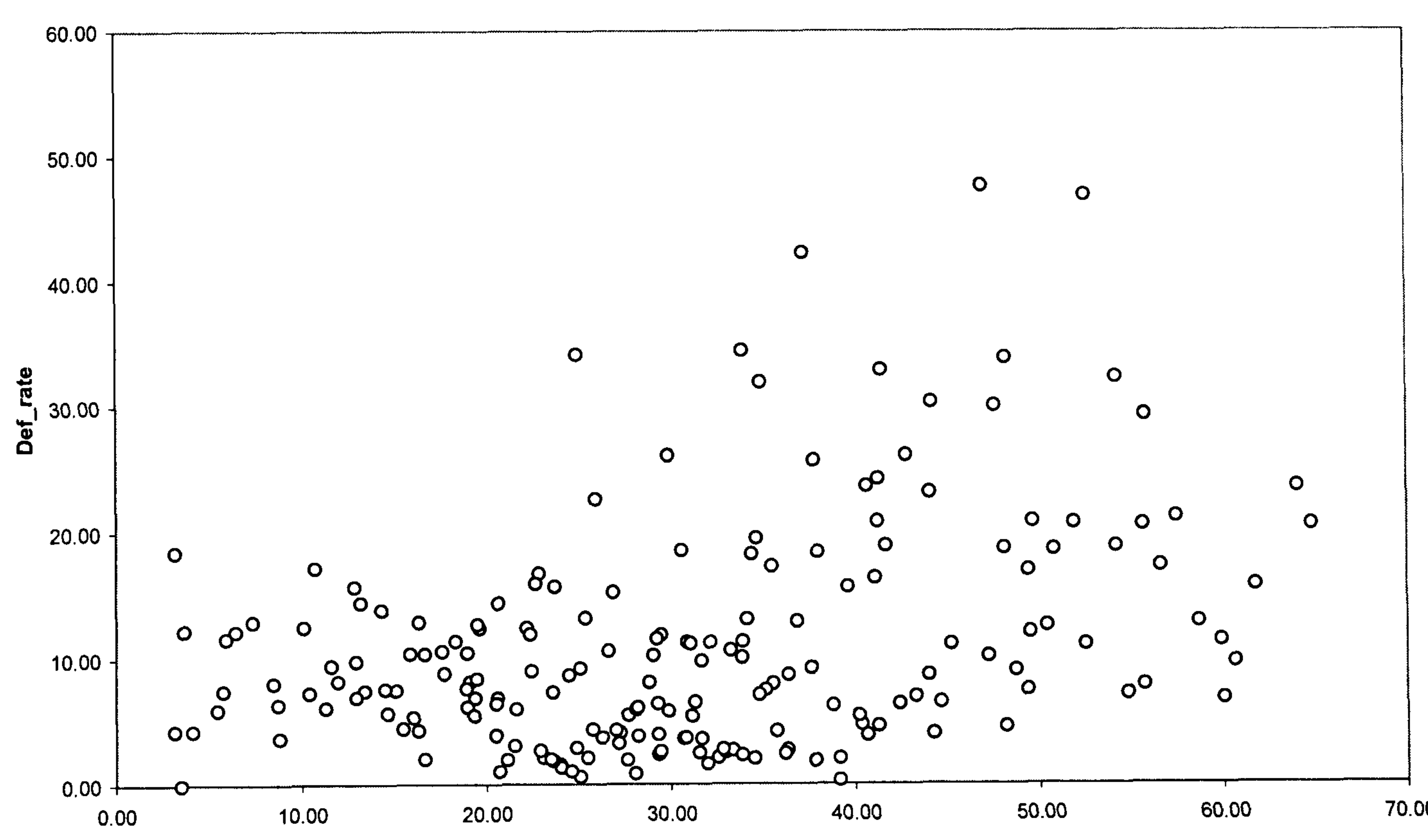


Figure G-16. Scatter plot for the percentage of forest lost and DstHoaB

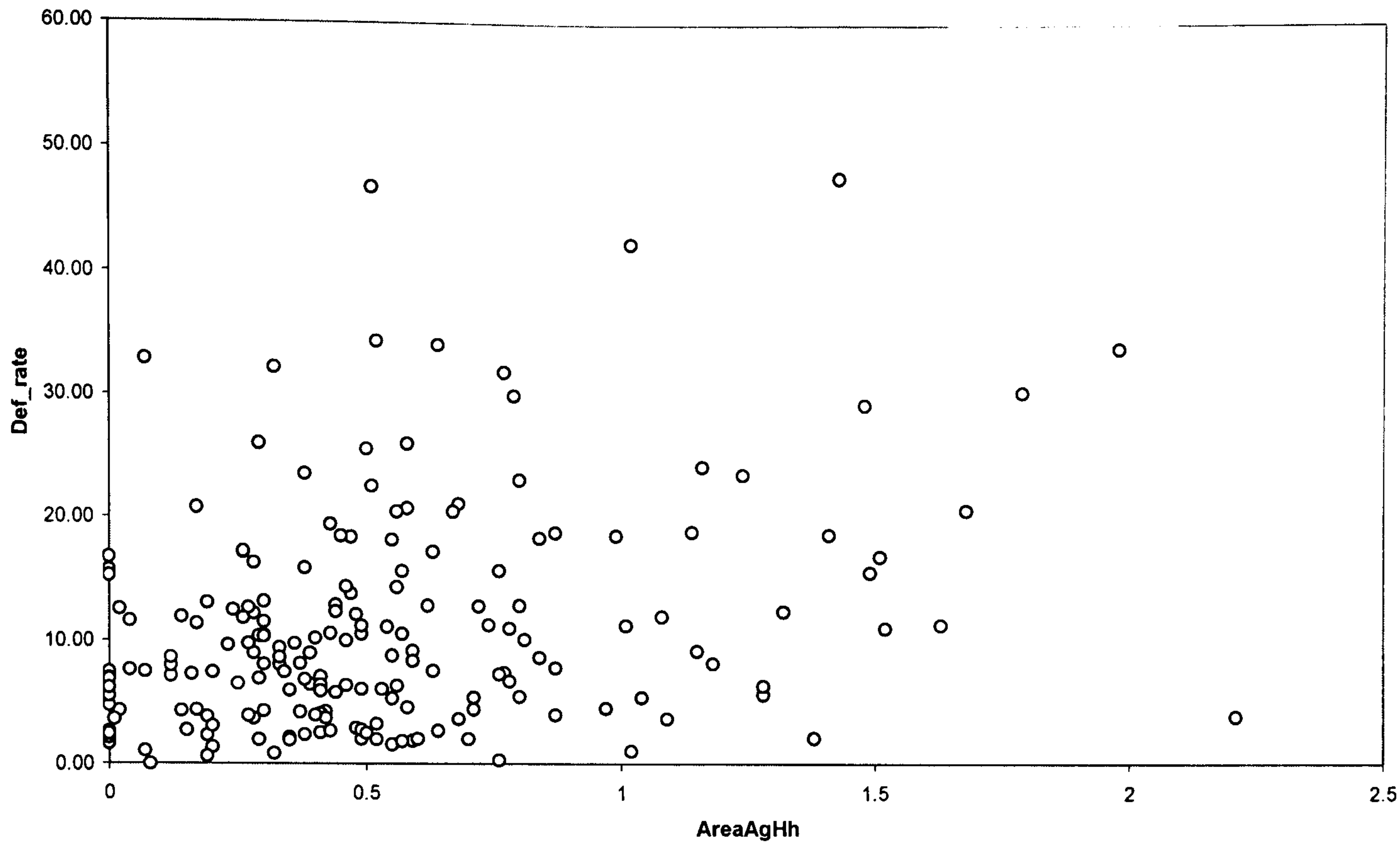


Figure G-17. Scatter plot for the percentage of forest lost and AreaAgHh

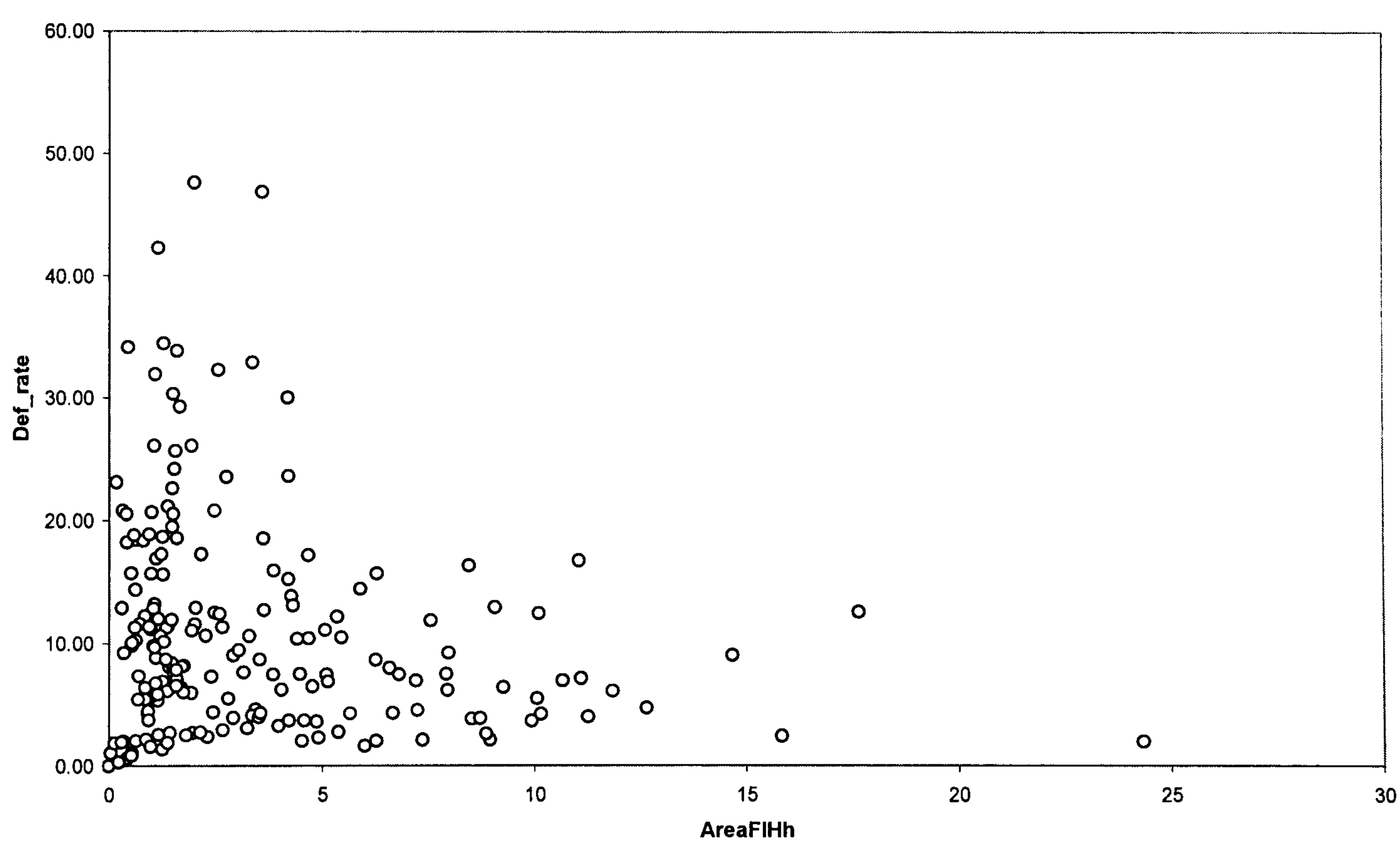


Figure G-18. Scatter plot for the percentage of forest lost and AreaFlHh

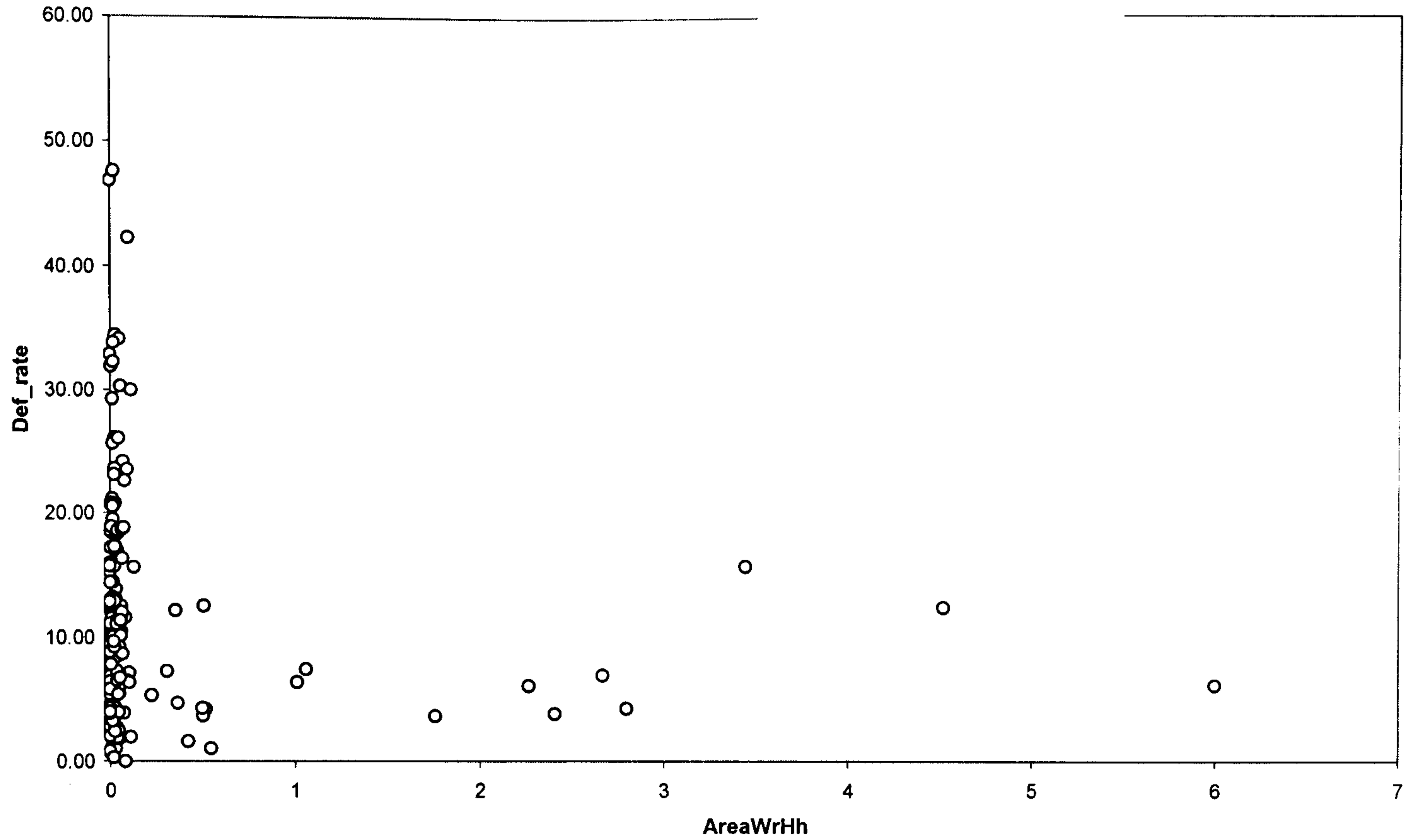


Figure G-19. Scatter plot for the percentage of forest lost and AreaWrHh

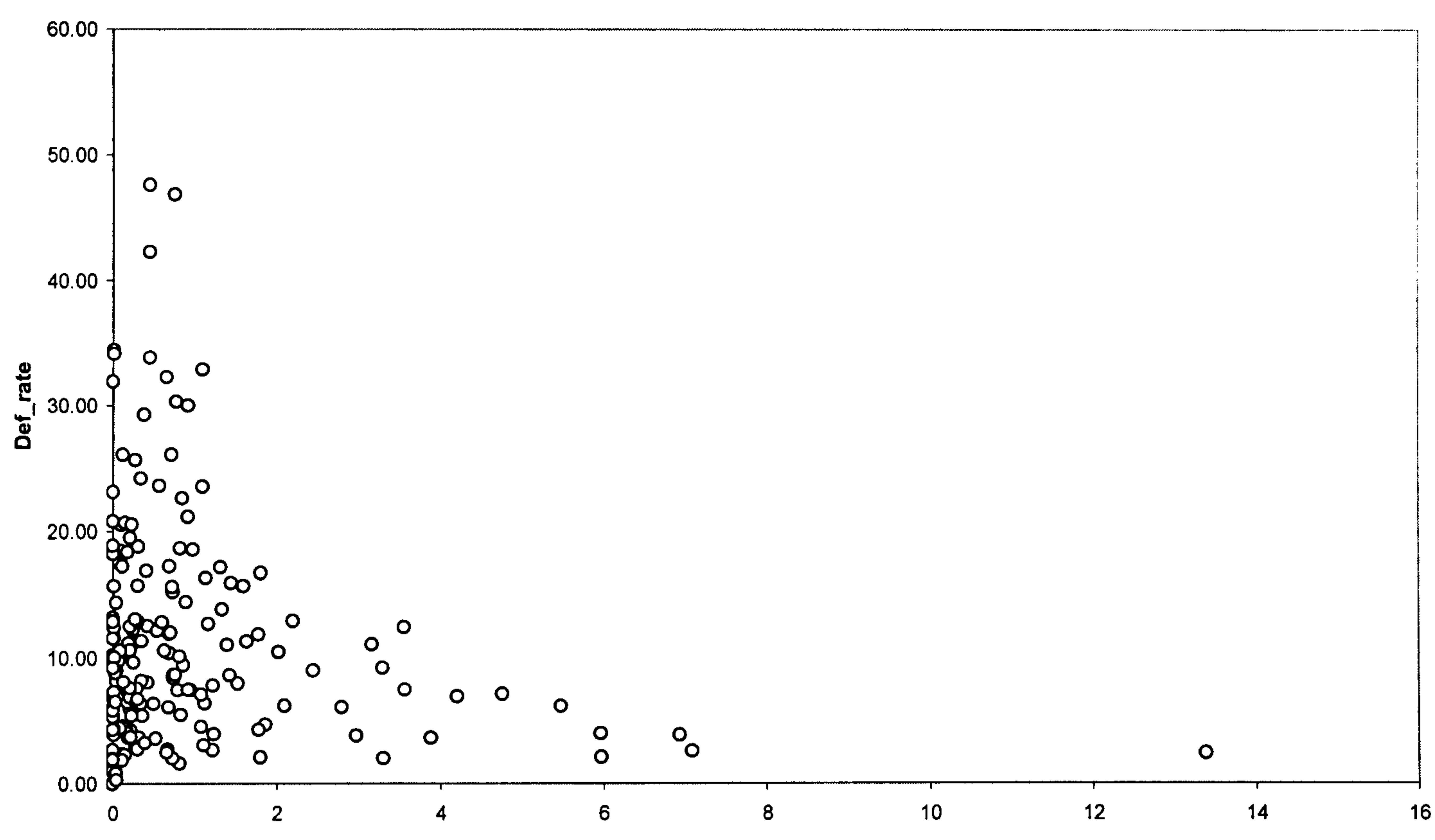


Figure G-20. Scatter plot for the percentage of forest lost and AreaFSHh

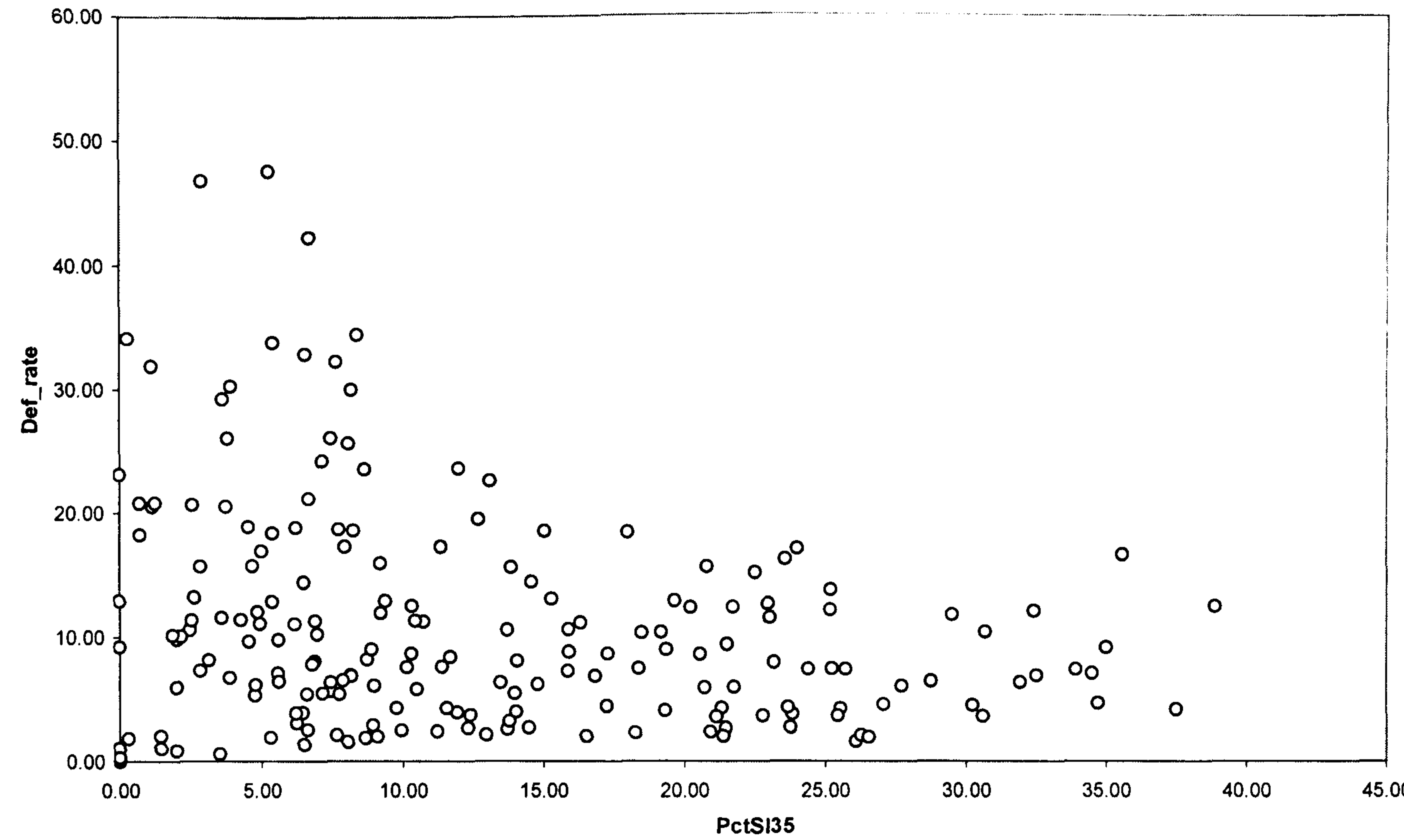


Figure G-21. Scatter plot for the percentage of forest lost and PctSI35

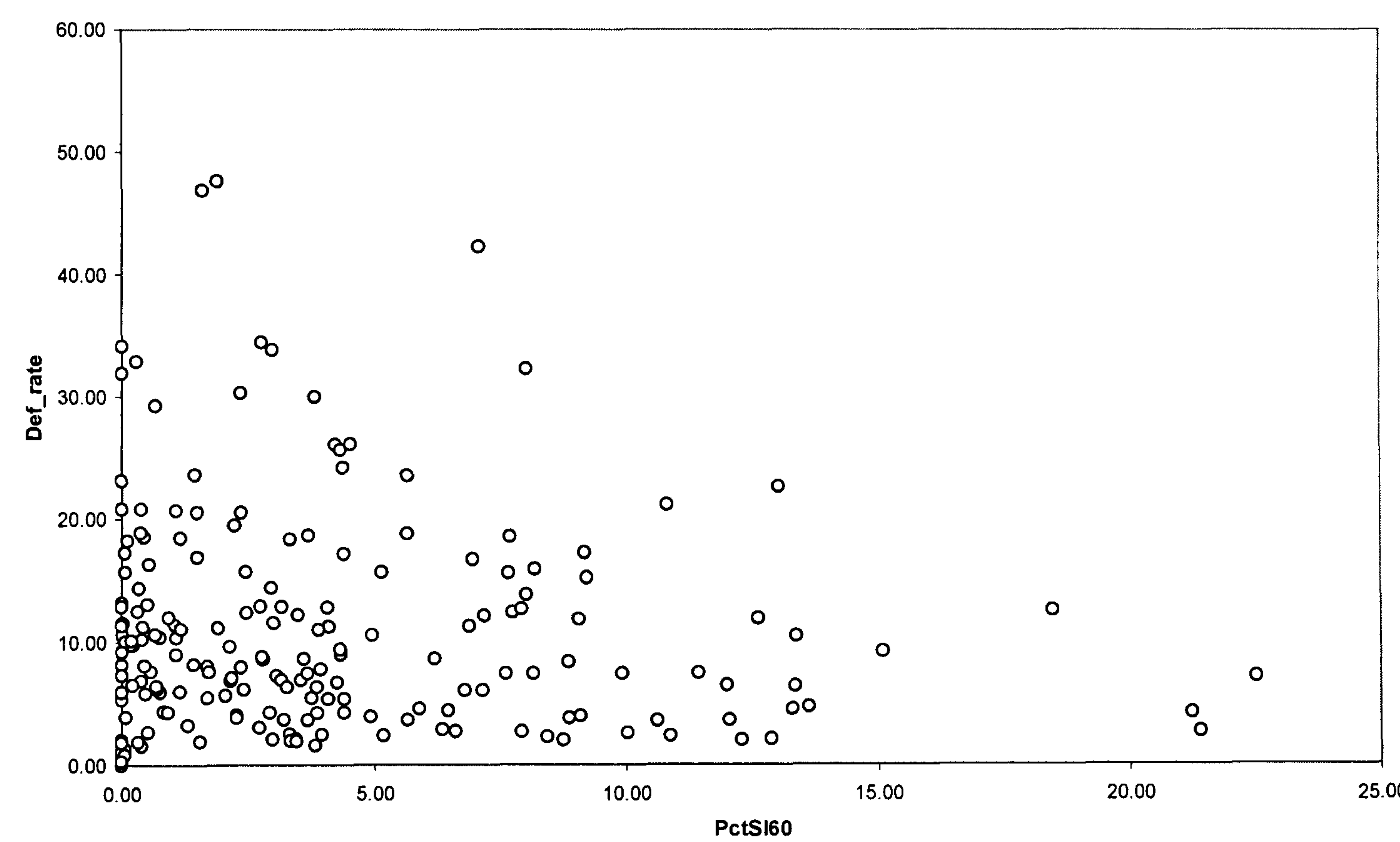


Figure G-22. Scatter plot for the percentage of forest lost and PctSI60

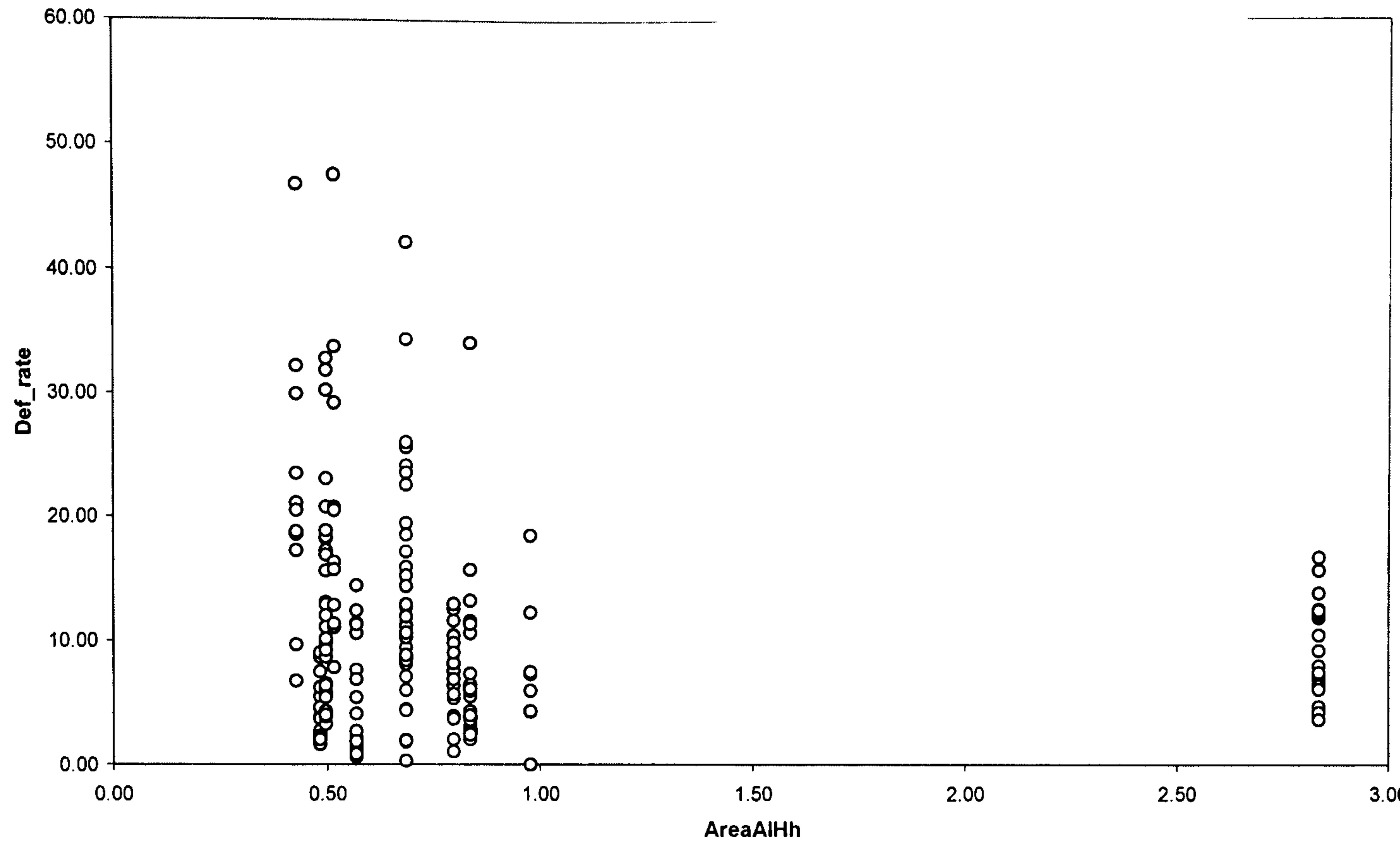


Figure G-23. Scatter plot for the percentage of forest lost and AreaAlHh

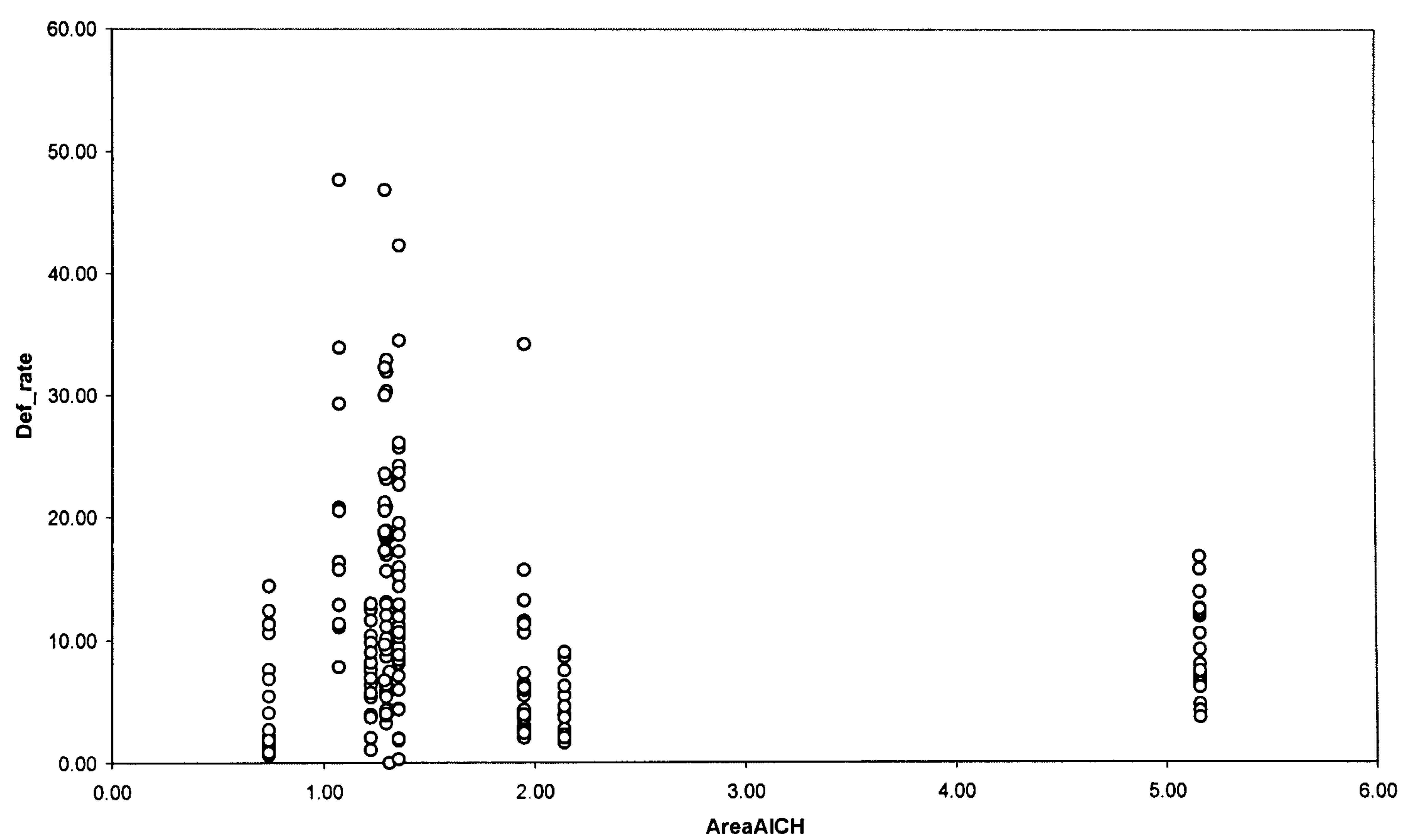


Figure G-24. Scatter plot for the percentage of forest lost and AreaAlCH

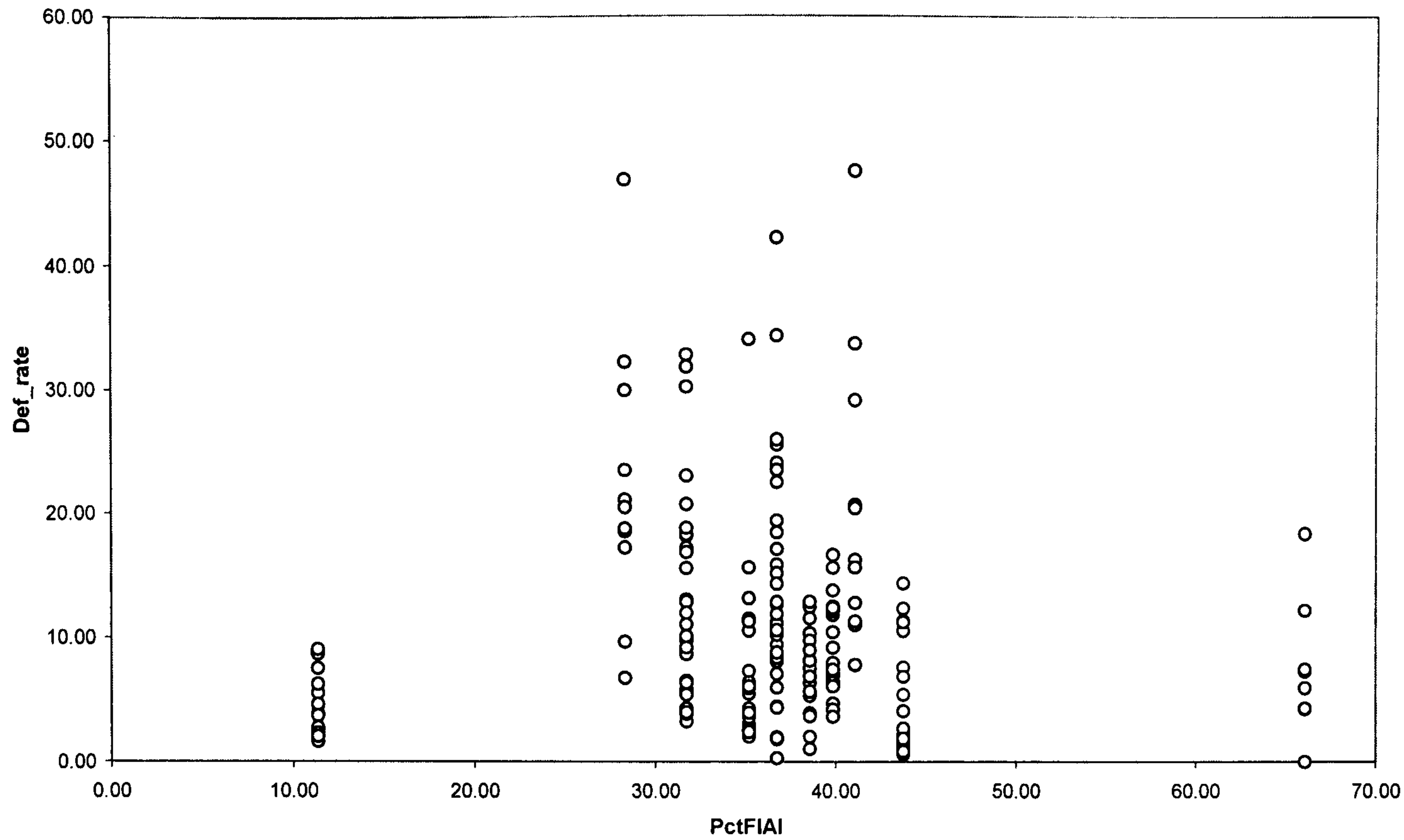


Figure G-25. Scatter plot for the percentage of forest lost and PctFIAI

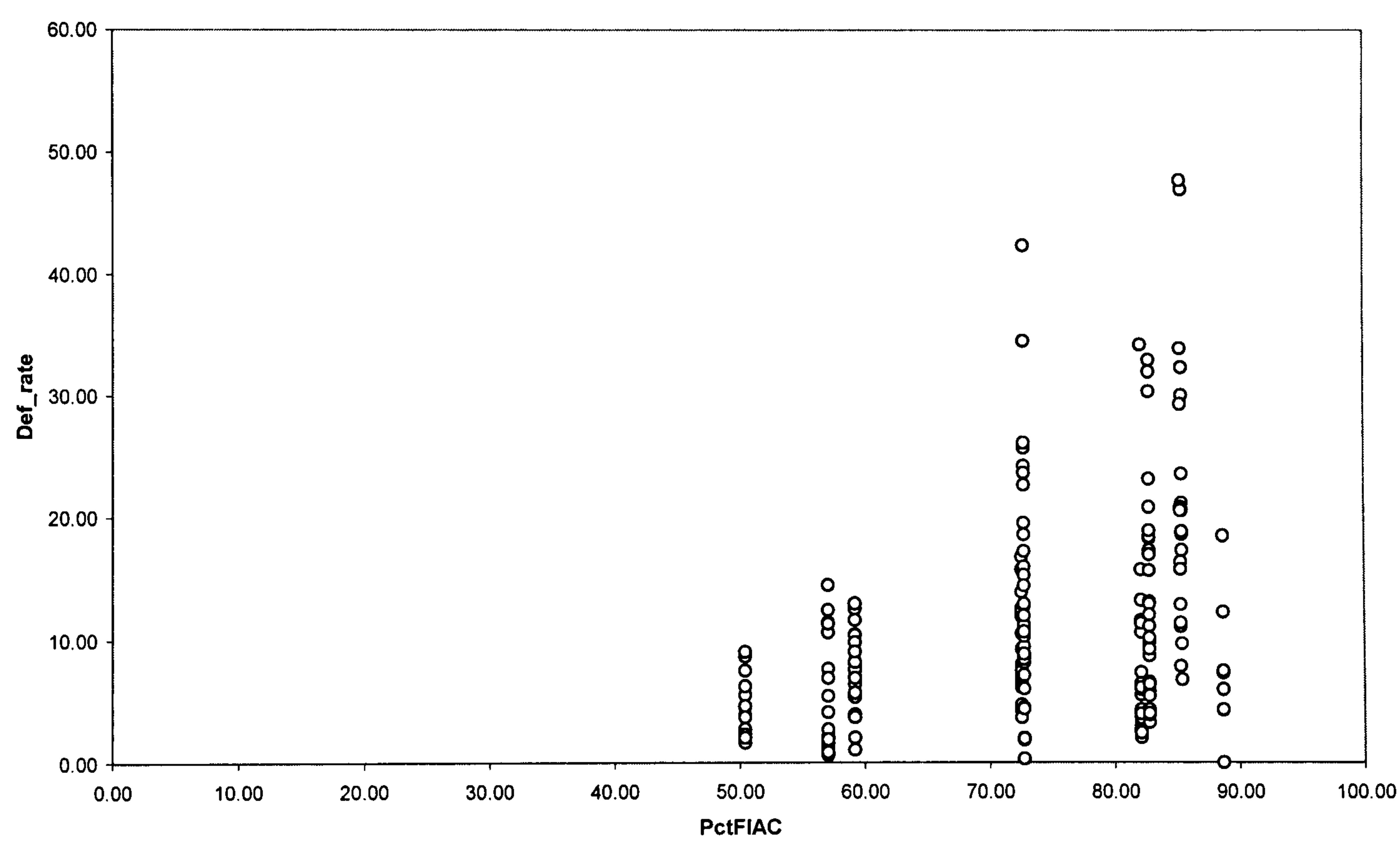


Figure G-26. Scatter plot for the percentage of forest lost and PctFIAC

Scatter plots between the percentage of forestry land afforested and independent variables

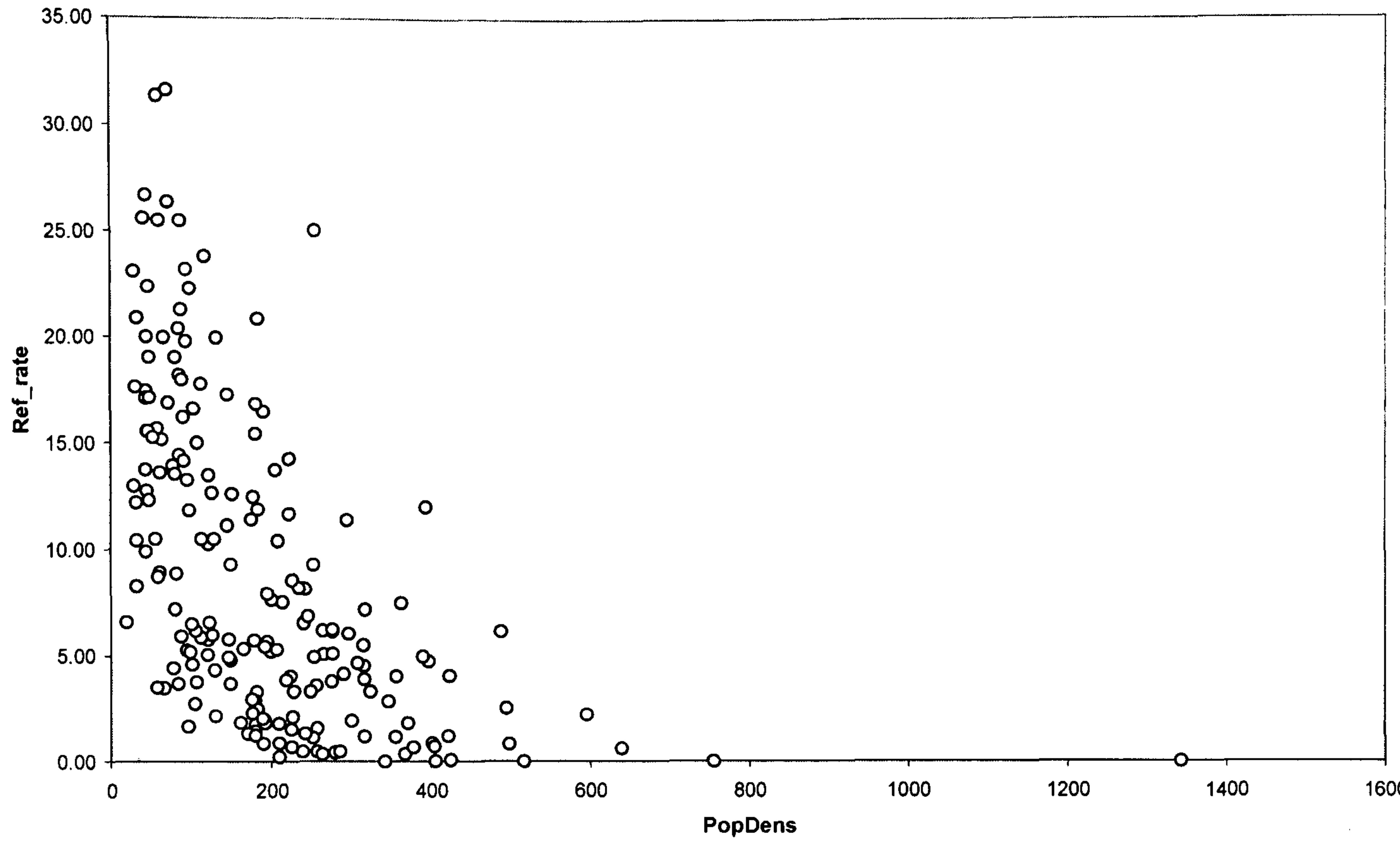


Figure G-27. Scatter plot for the percentage of forestry land with no forest cover afforested and PopDens

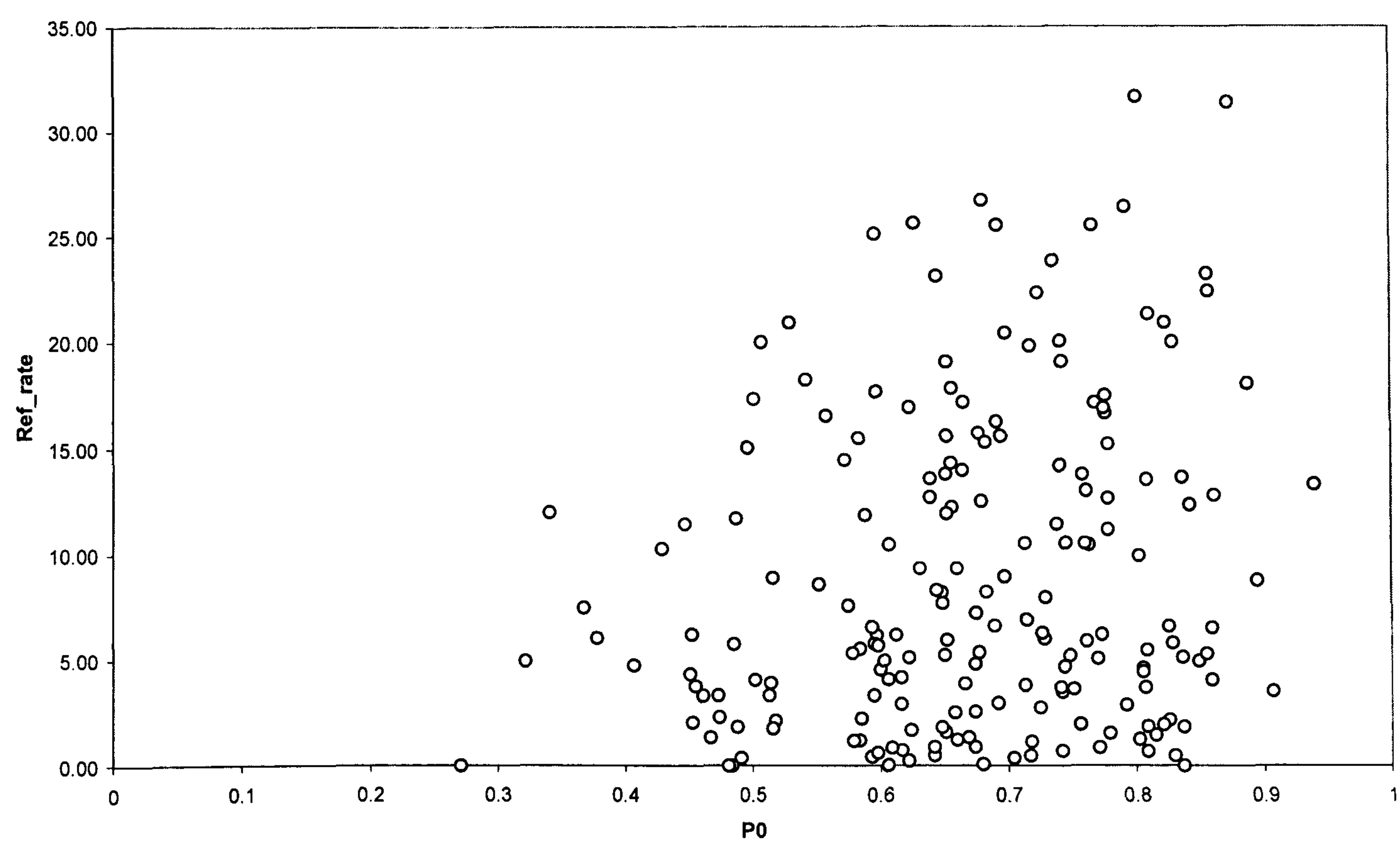


Figure G-28. Scatter plot for the percentage of forestry land with no forest cover afforested and P0

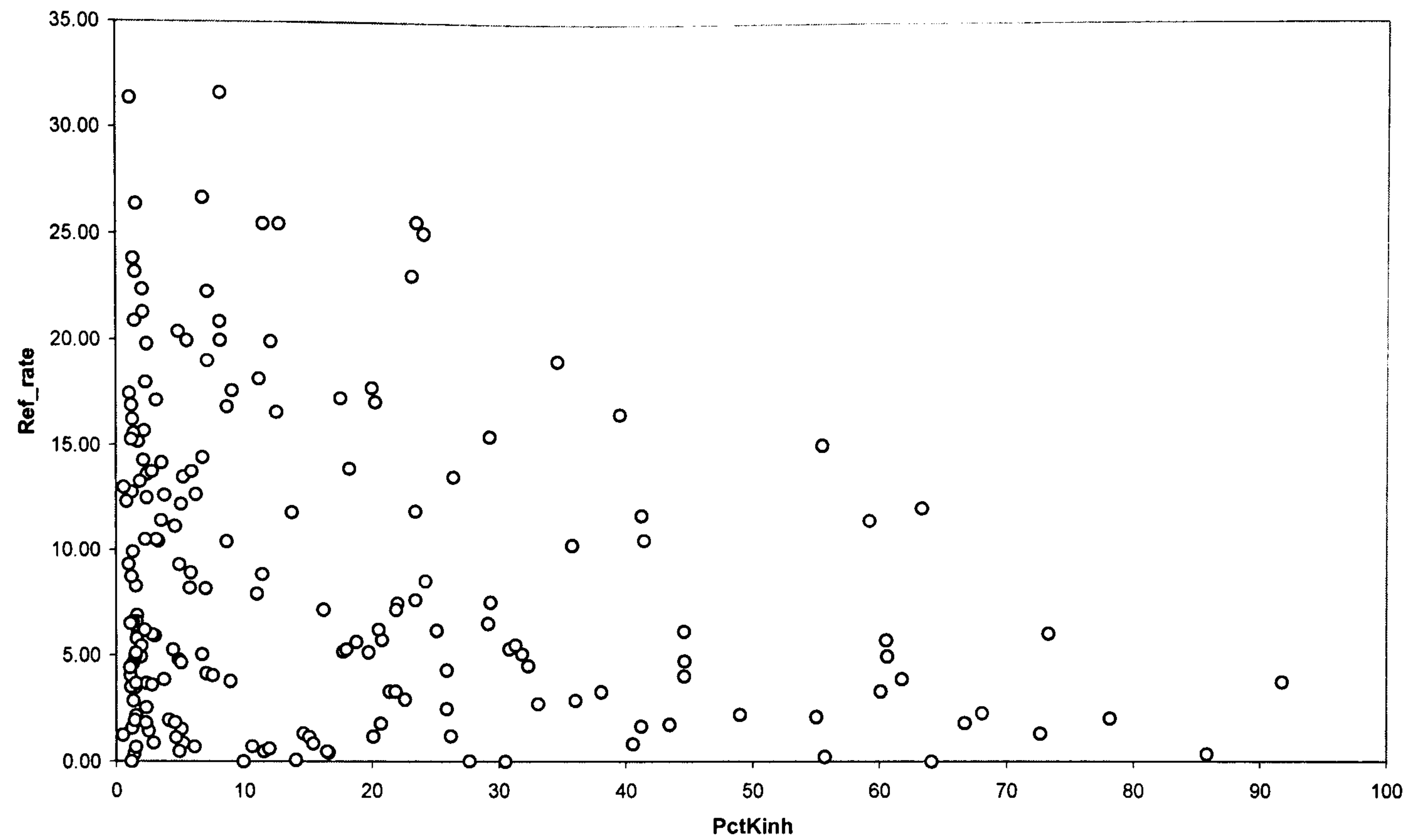


Figure G-29. Scatter plot for the percentage of forestry land with no forest cover afforested and PctKinh

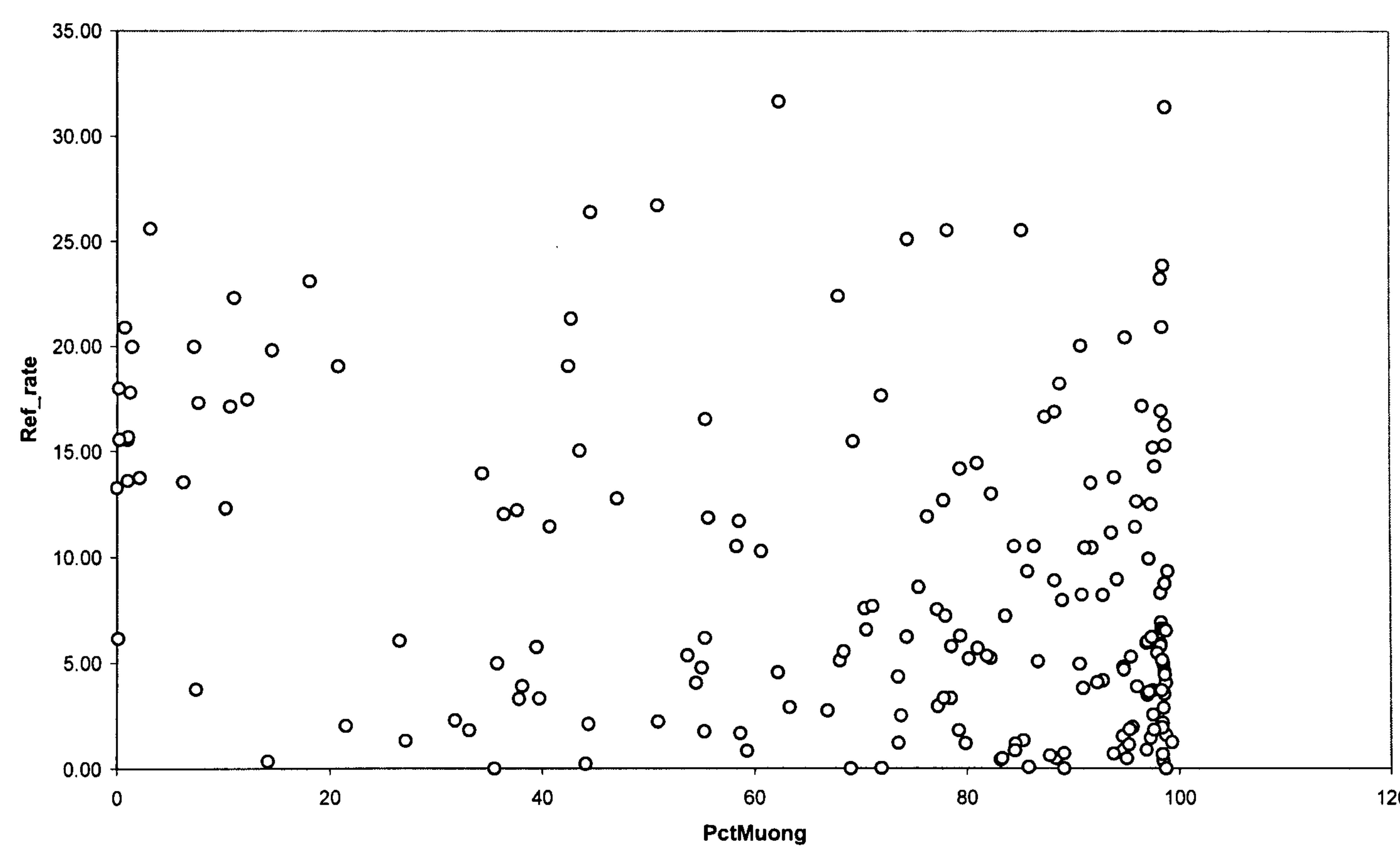


Figure G-30. Scatter plot for the percentage of forestry land with no forest cover afforested and PctMuong

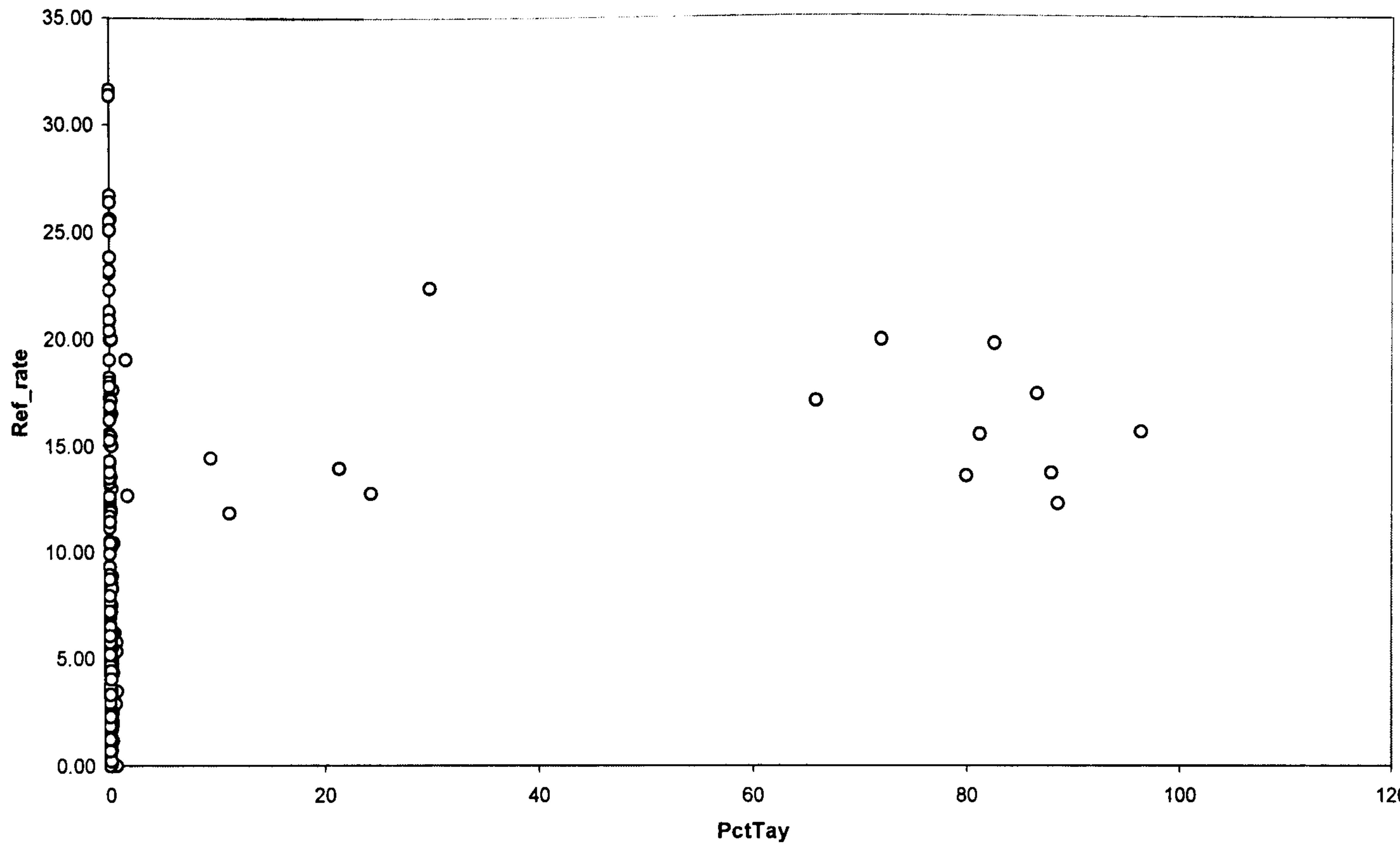


Figure G-31. Scatter plot for the percentage of forestry land with no forest cover afforested and PctTay

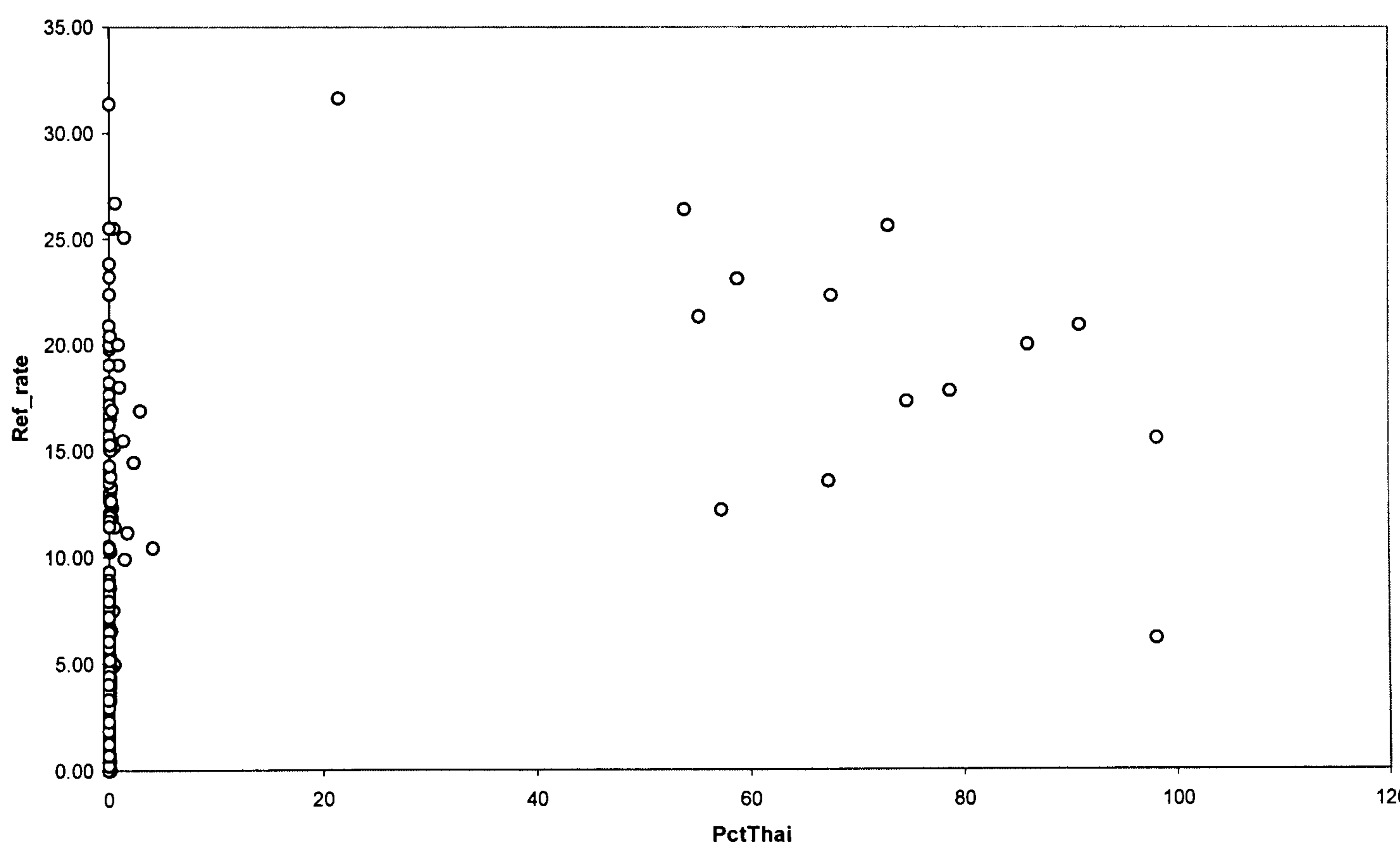


Figure G-32. Scatter plot for the percentage of forestry land with no forest cover afforested and PctThai

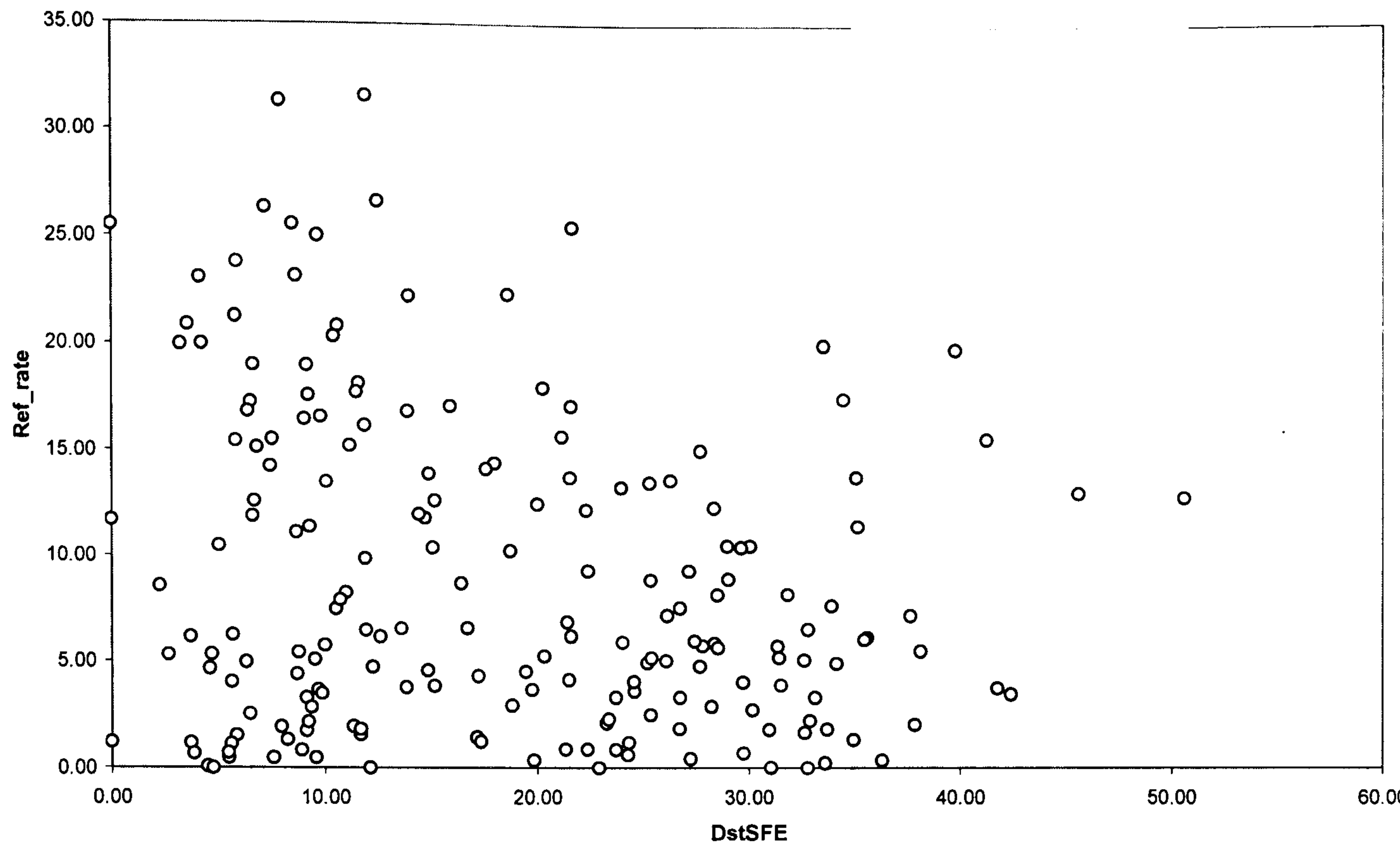


Figure G-33. Scatter plot for the percentage of forestry land with no forest cover afforested and DstSFE

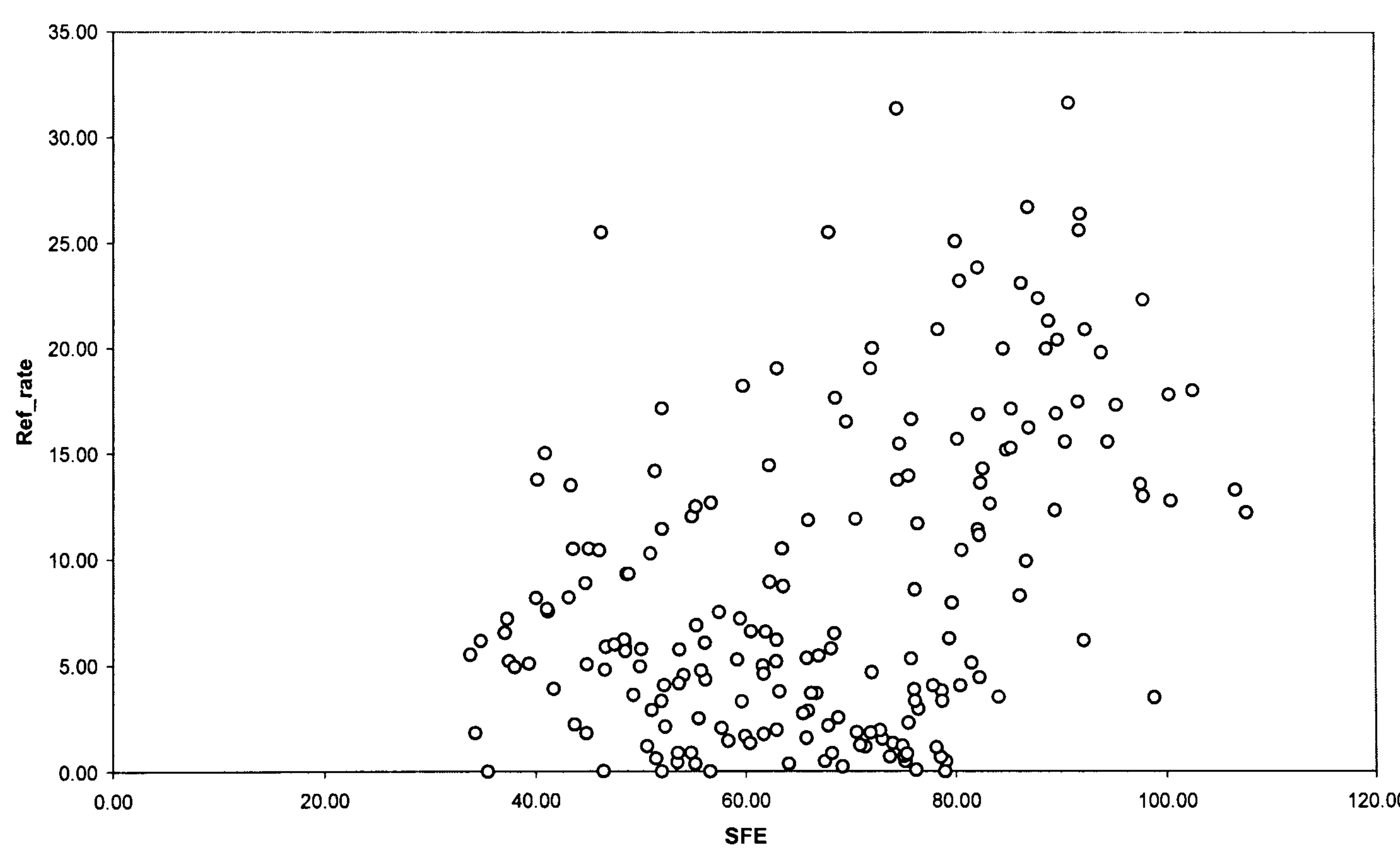


Figure G-34. Scatter plot for the percentage of forestry land with no forest cover afforested and SFE

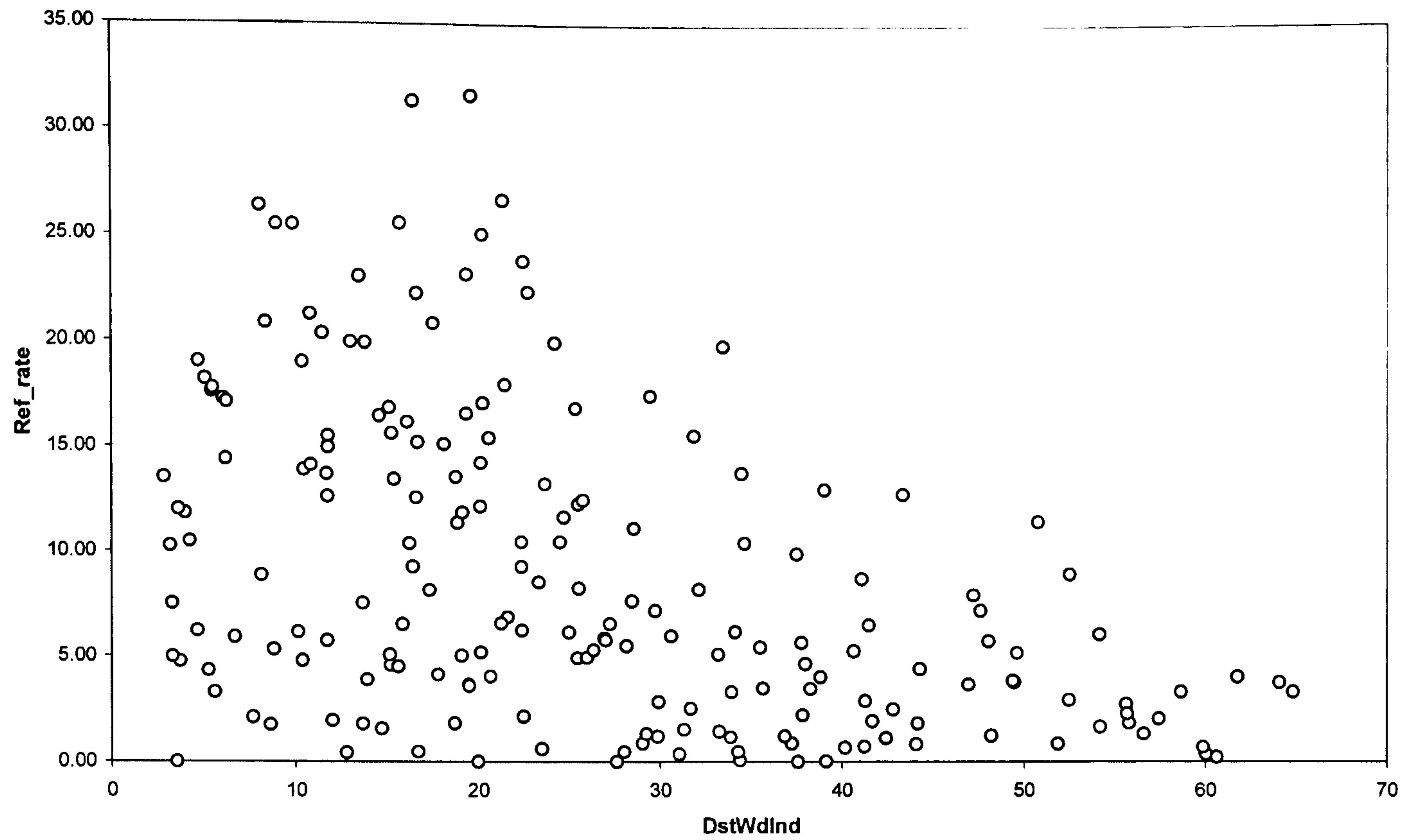


Figure G-35. Scatter plot for the percentage of forestry land with no forest cover afforested and DstWdInd

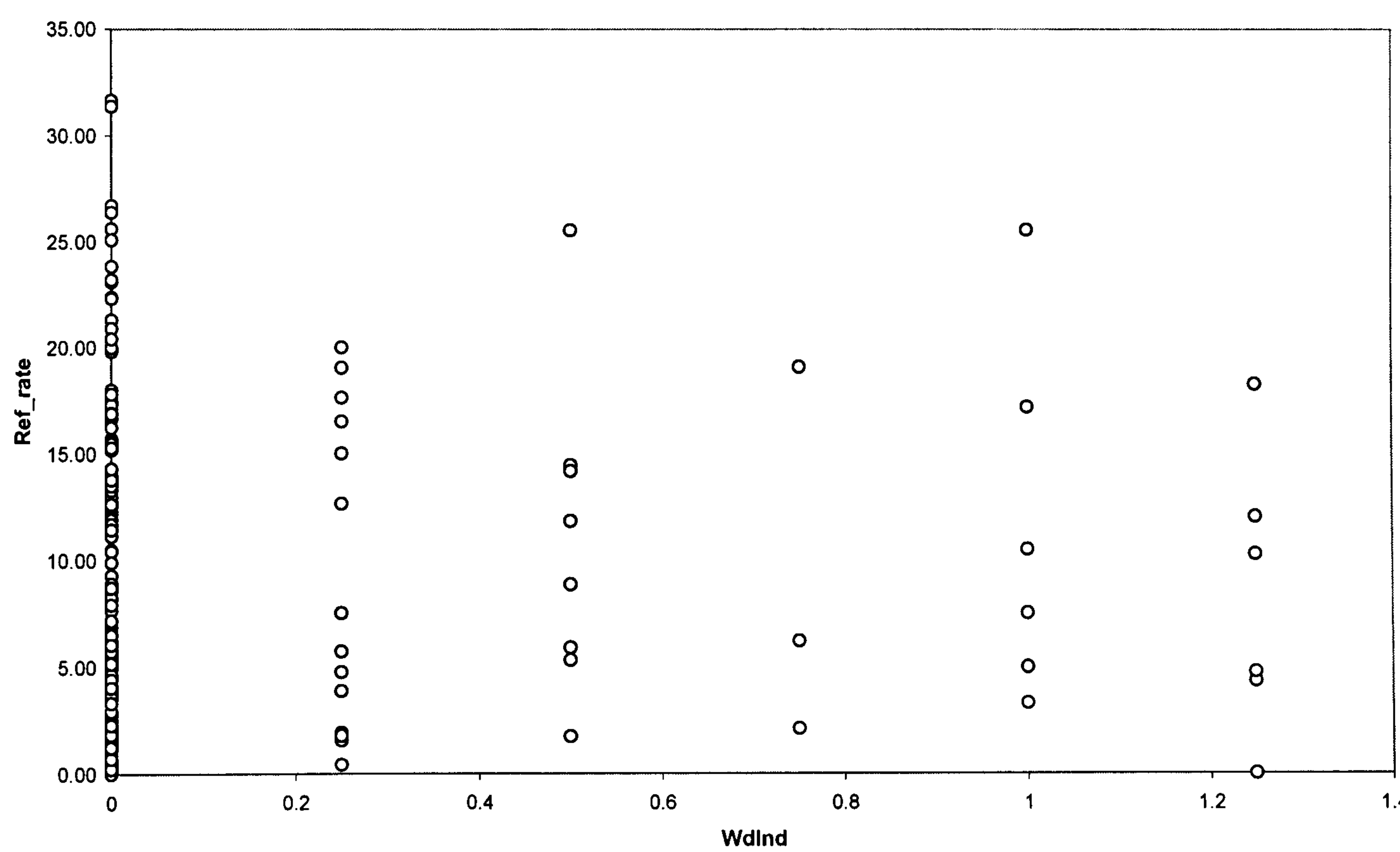


Figure G-36. Scatter plot for the percentage of forestry land with no forest cover afforested and WdInd

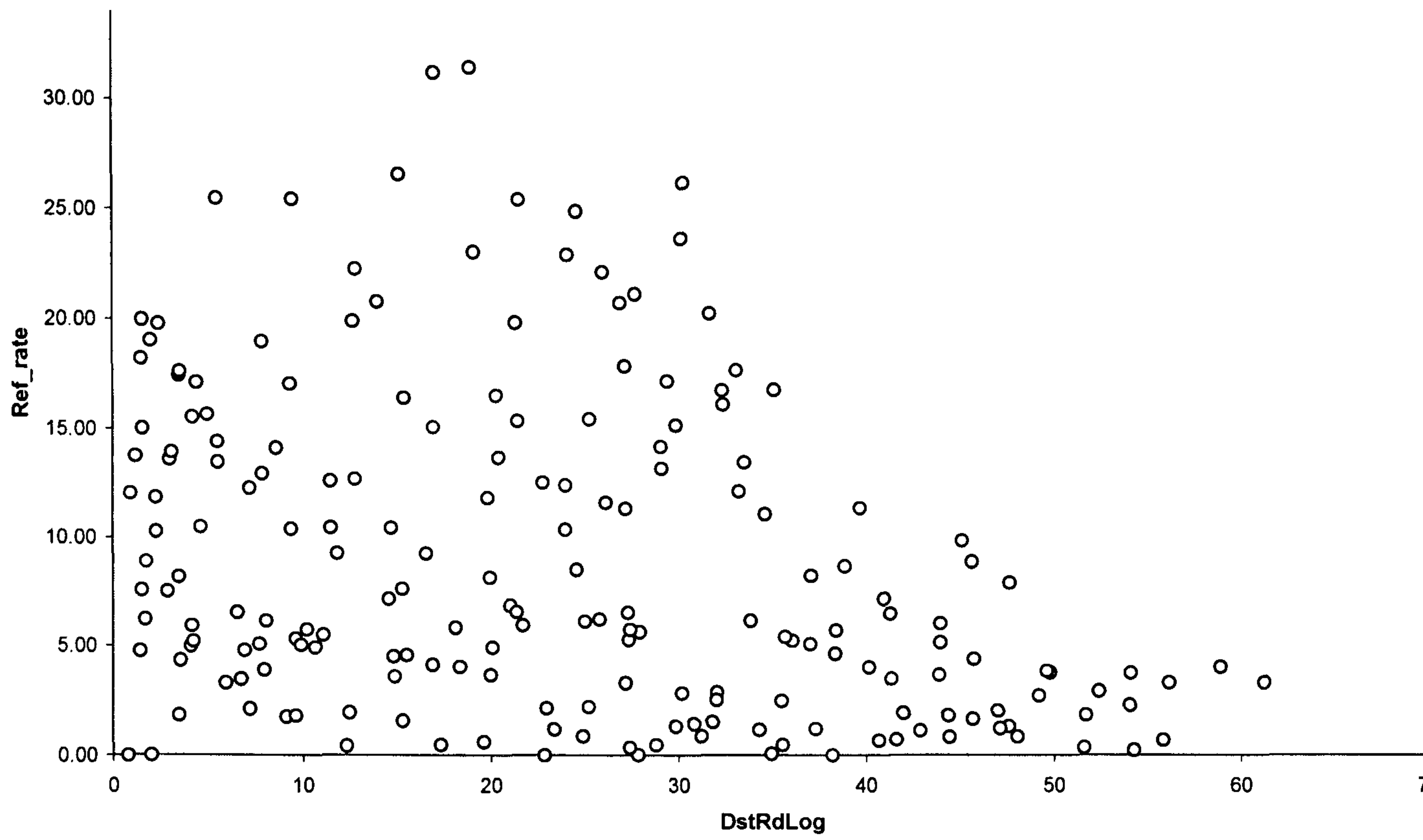


Figure G-37. Scatter plot for the percentage of forestry land with no forest cover afforested and DstRdLog

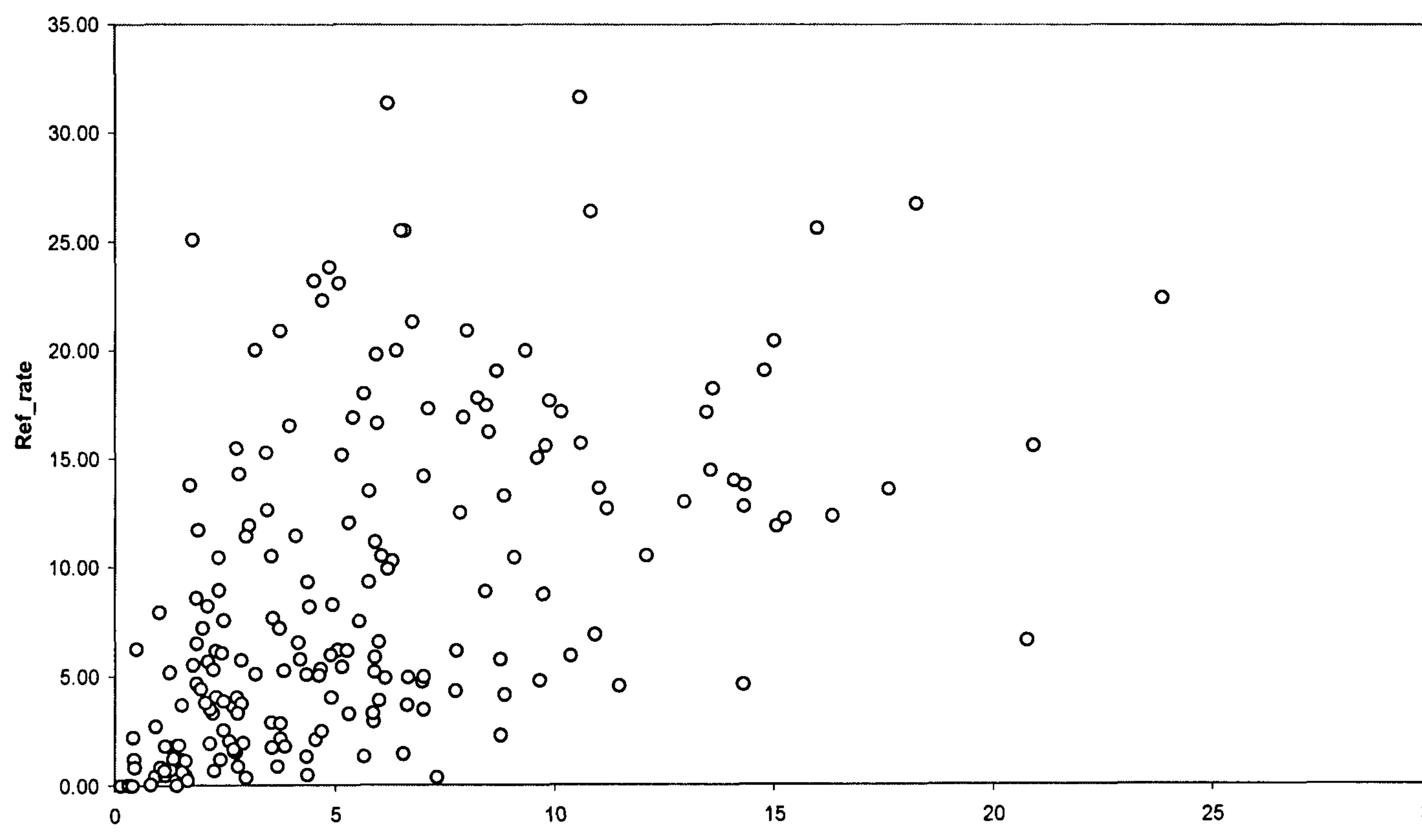


Figure G-38. Scatter plot for the percentage of forestry land with no forest cover afforested and DstAllRd

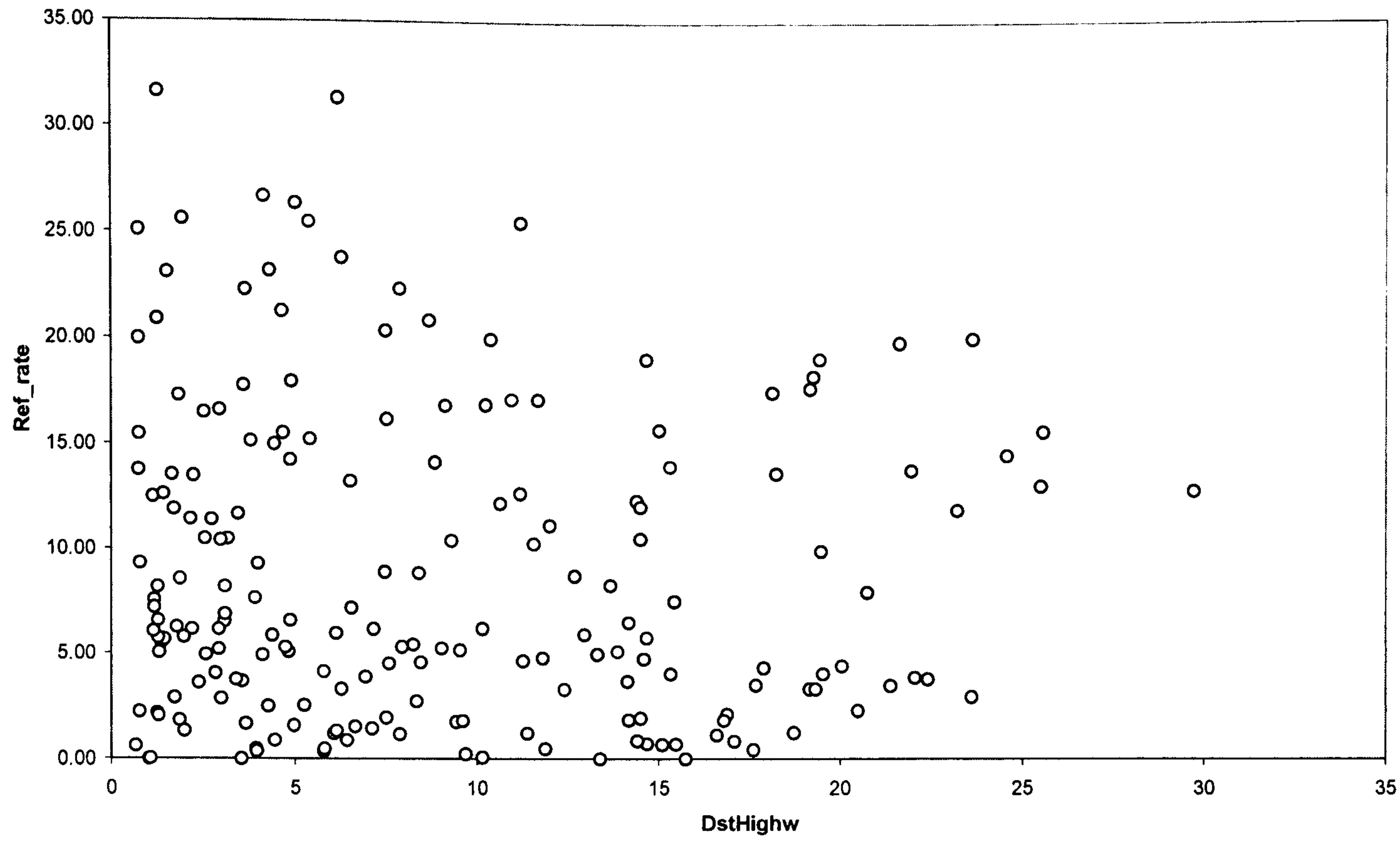


Figure G-39. Scatter plot for the percentage of forestry land with no forest cover afforested and DstHighw

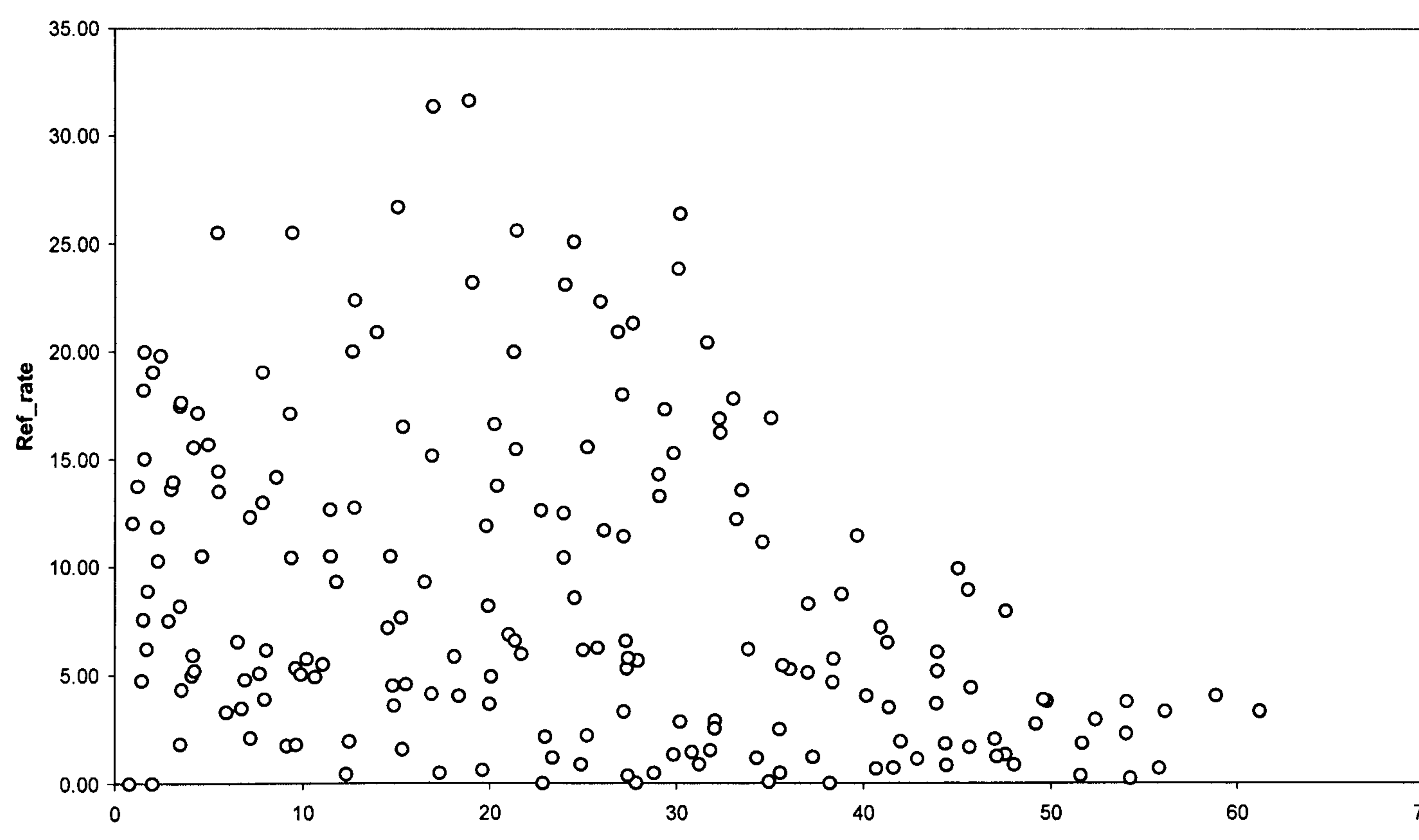


Figure G-40. Scatter plot for the percentage of forestry land with no forest cover afforested and DstMnRd

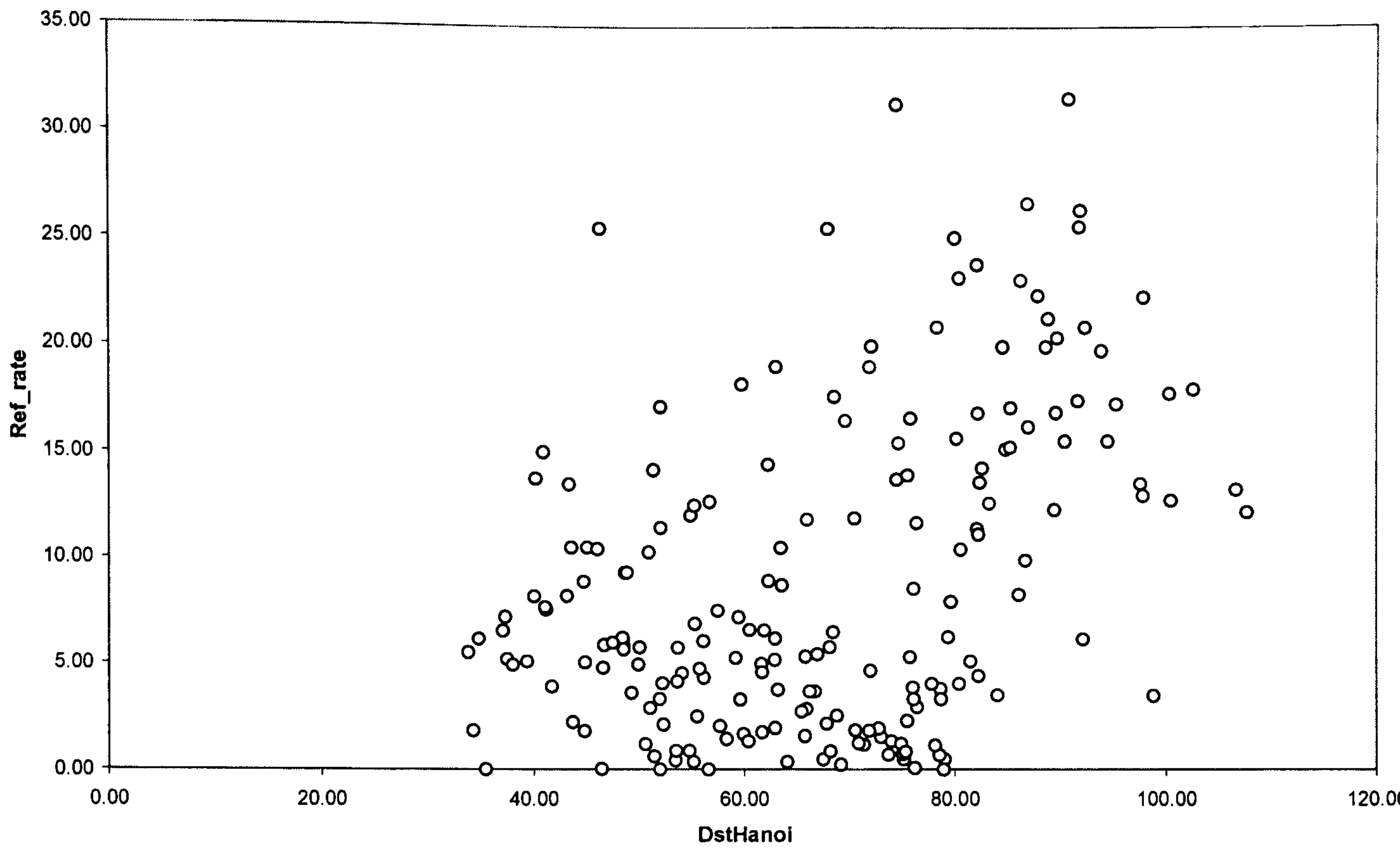


Figure G-41. Scatter plot for the percentage of forestry land with no forest cover afforested and DstHanoi

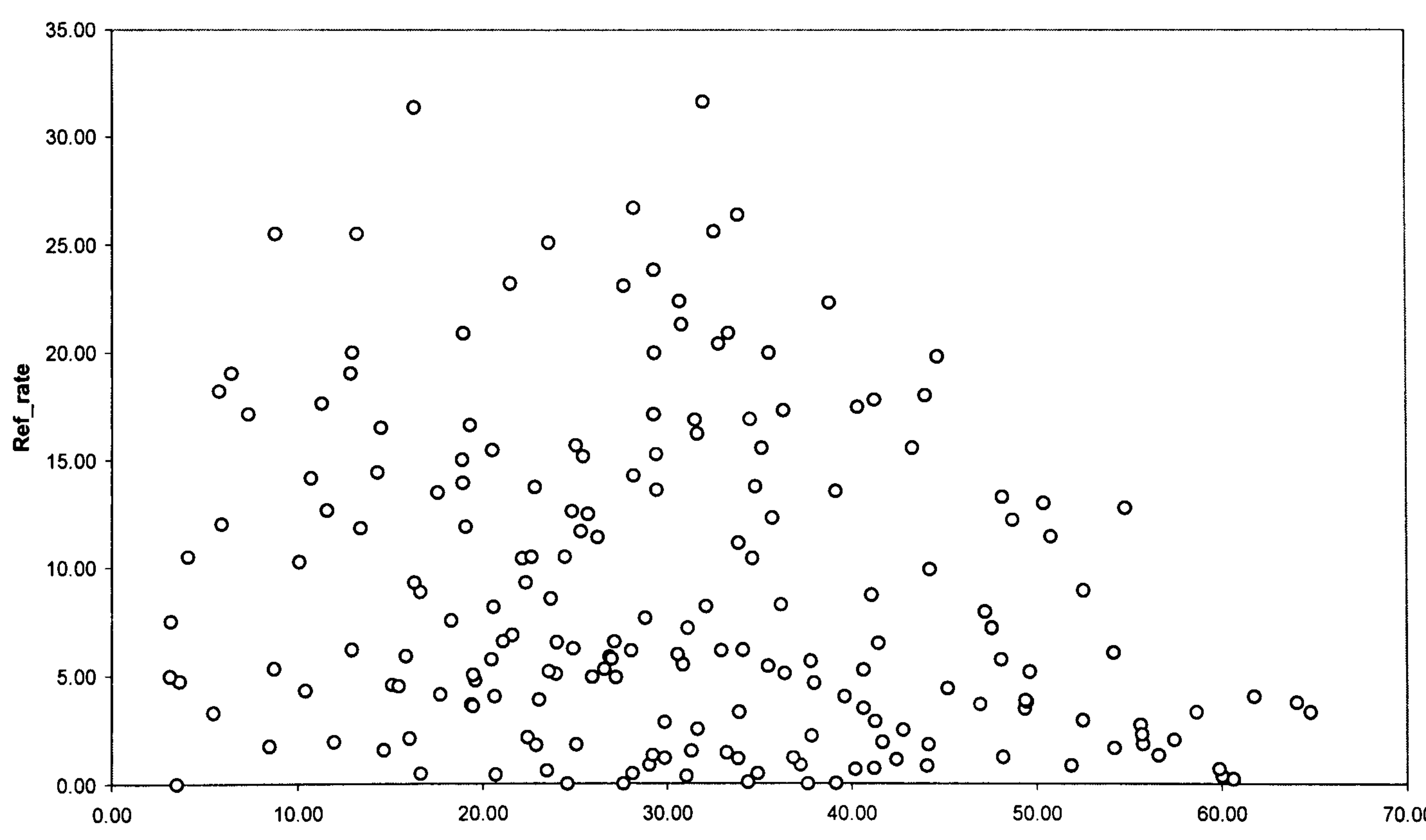


Figure G-42. Scatter plot for the percentage of forestry land with no forest cover afforested and DstHoaB

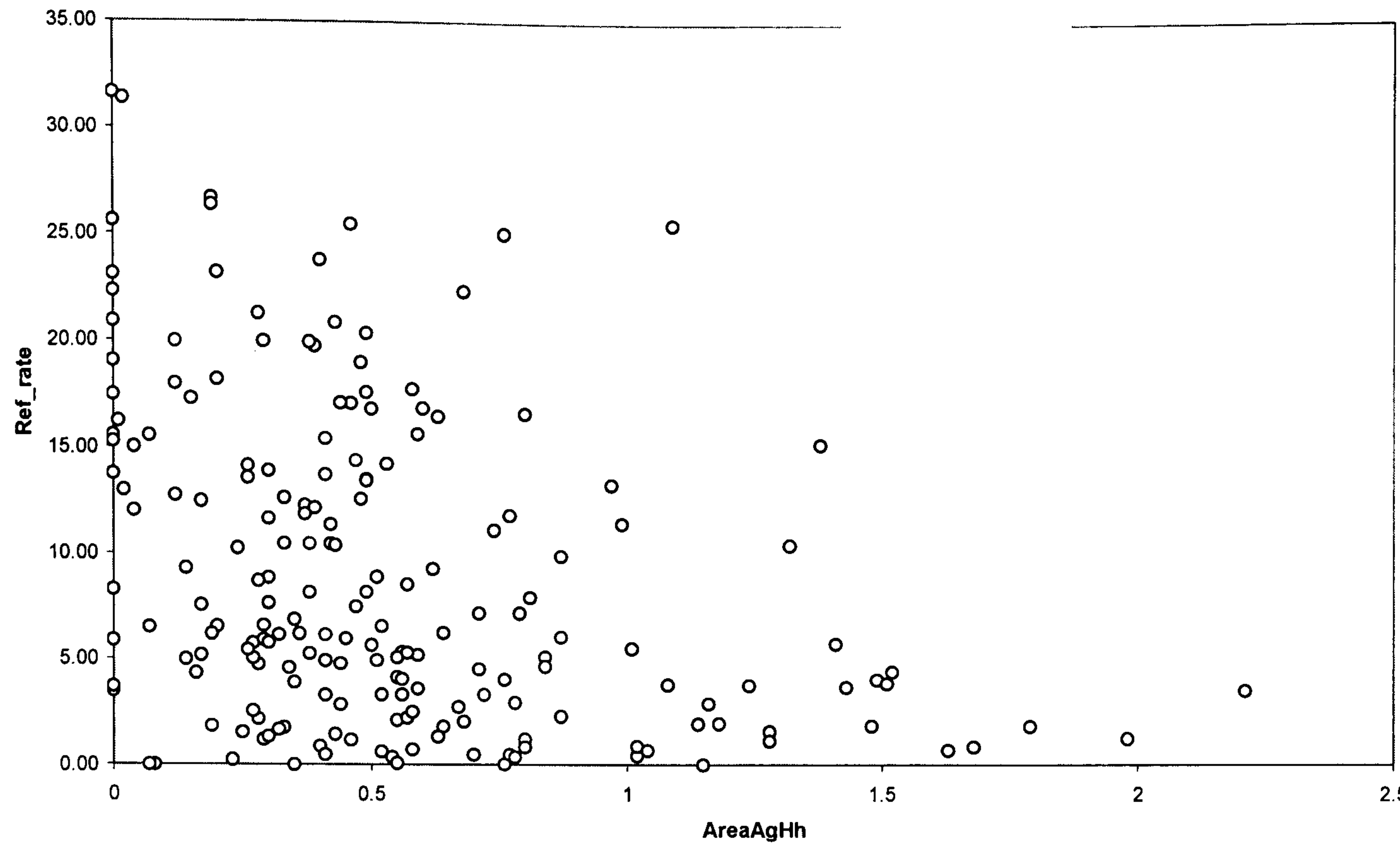


Figure G-43. Scatter plot for the percentage of forestry land with no forest cover afforested and AreaAgHh

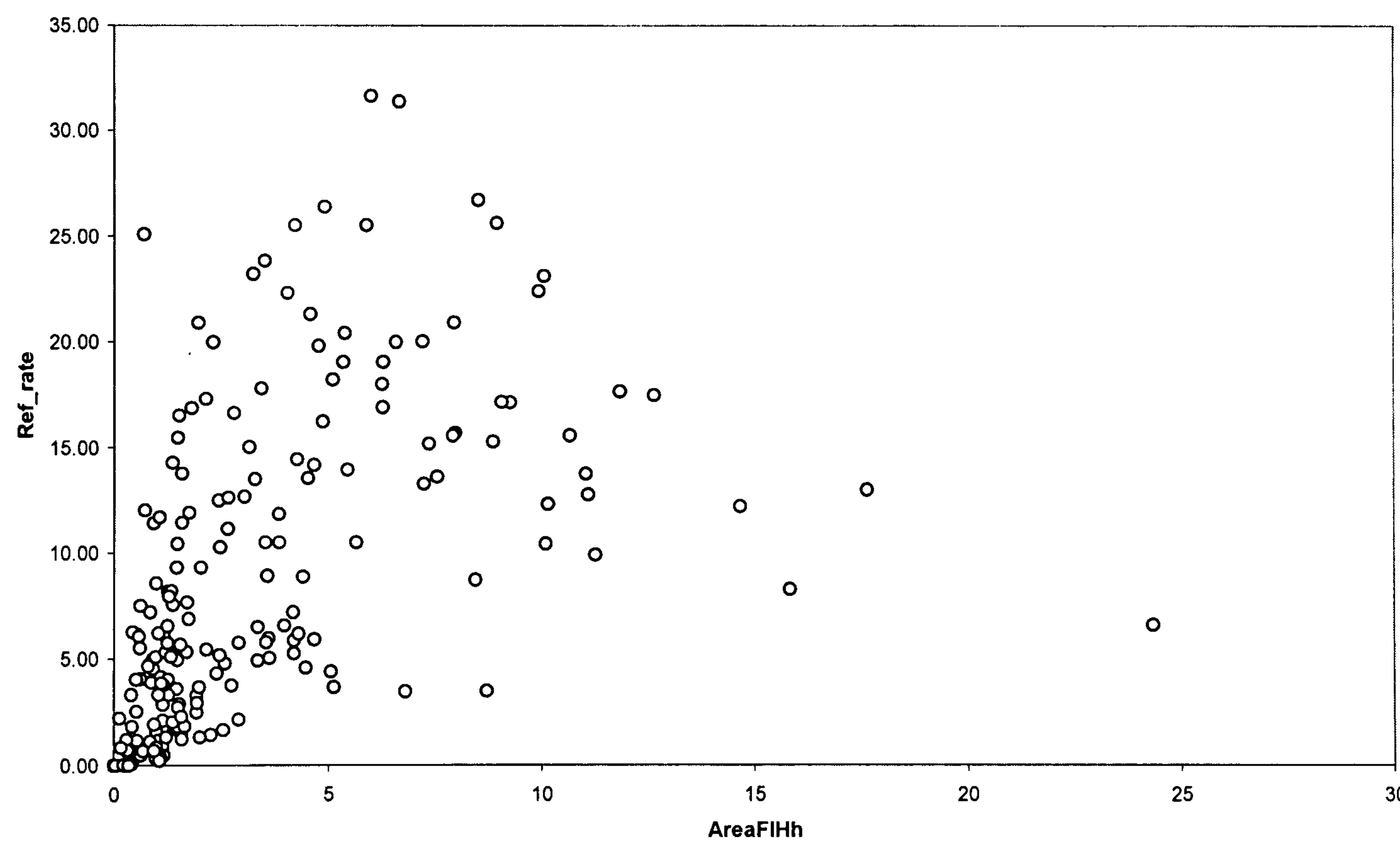


Figure G-44. Scatter plot for the percentage of forestry land with no forest cover afforested and AreaFlHh

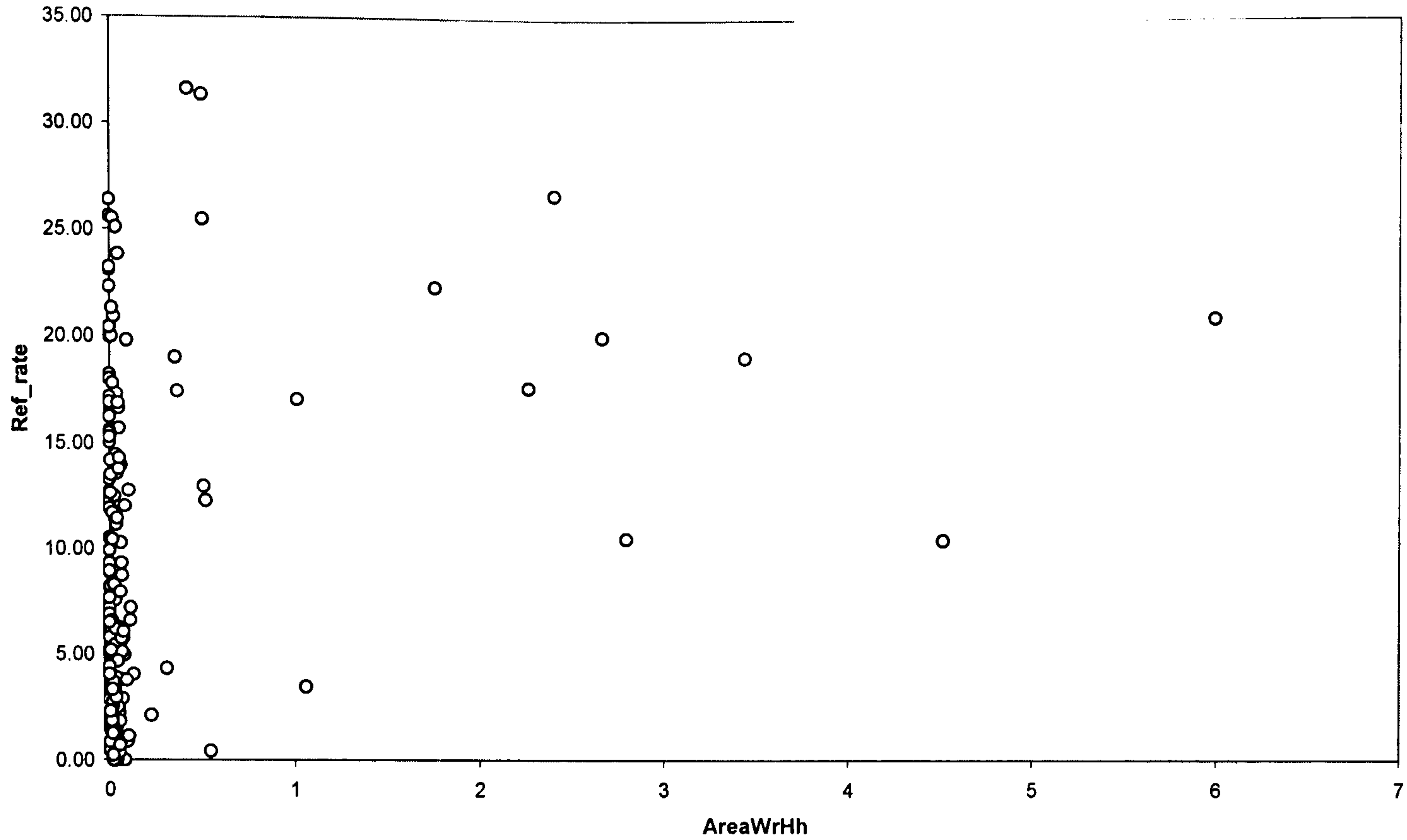


Figure G-45. Scatter plot for the percentage of forestry land with no forest cover afforested and AreaWrHh

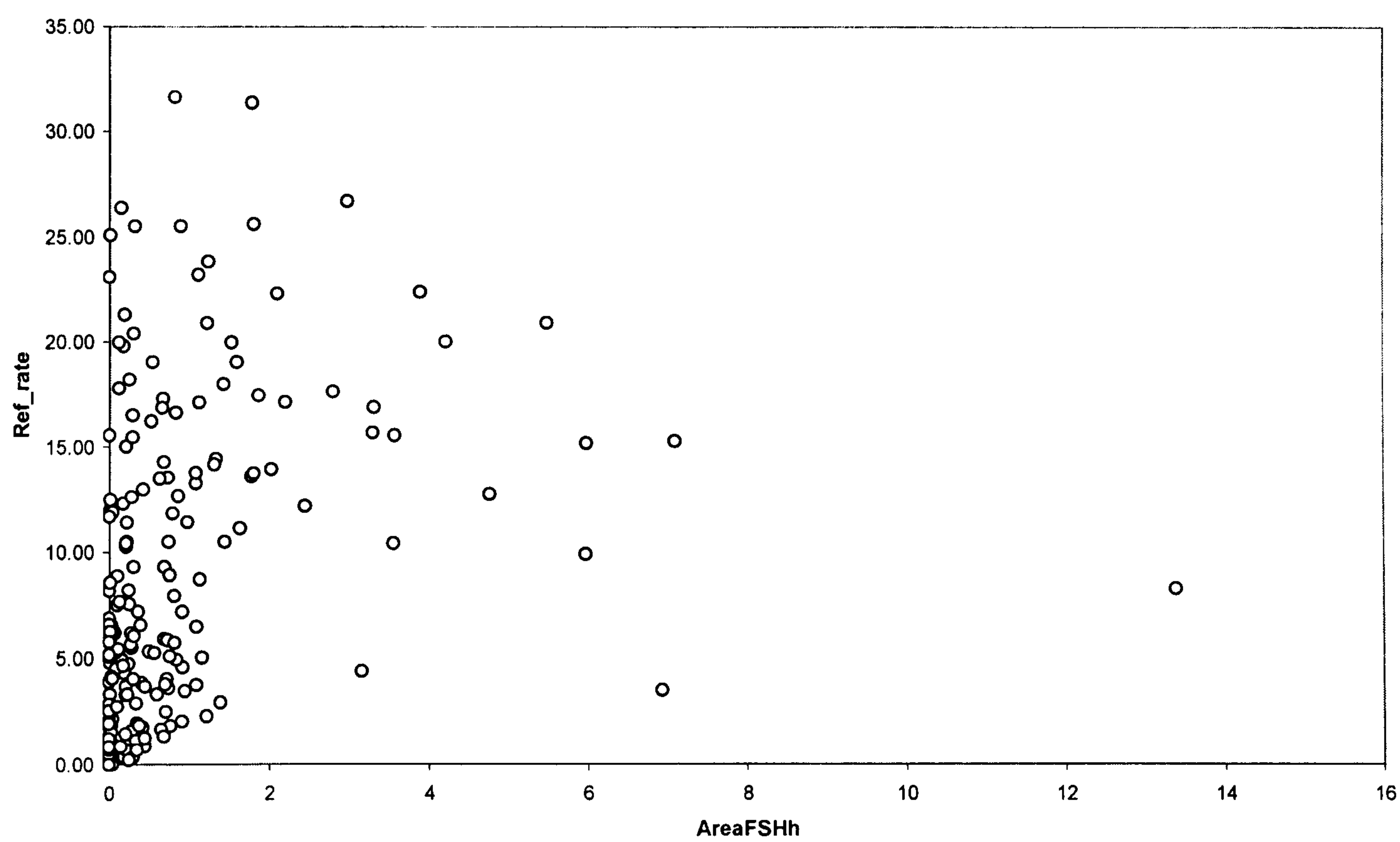


Figure G-46. Scatter plot for the percentage of forestry land with no forest cover afforested and AreaFSHh

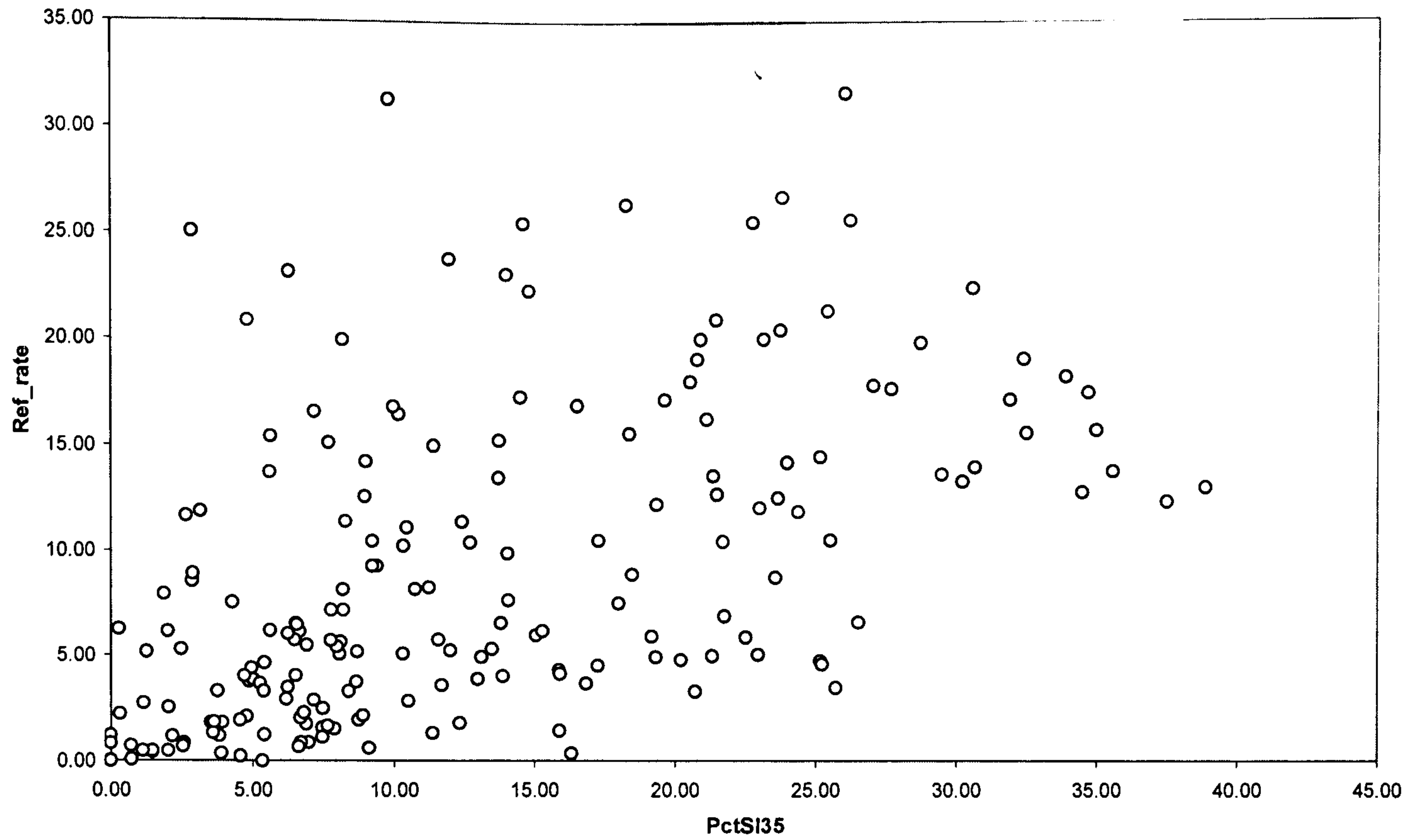


Figure G-47. Scatter plot for the percentage of forestry land with no forest cover afforested and PctSI35

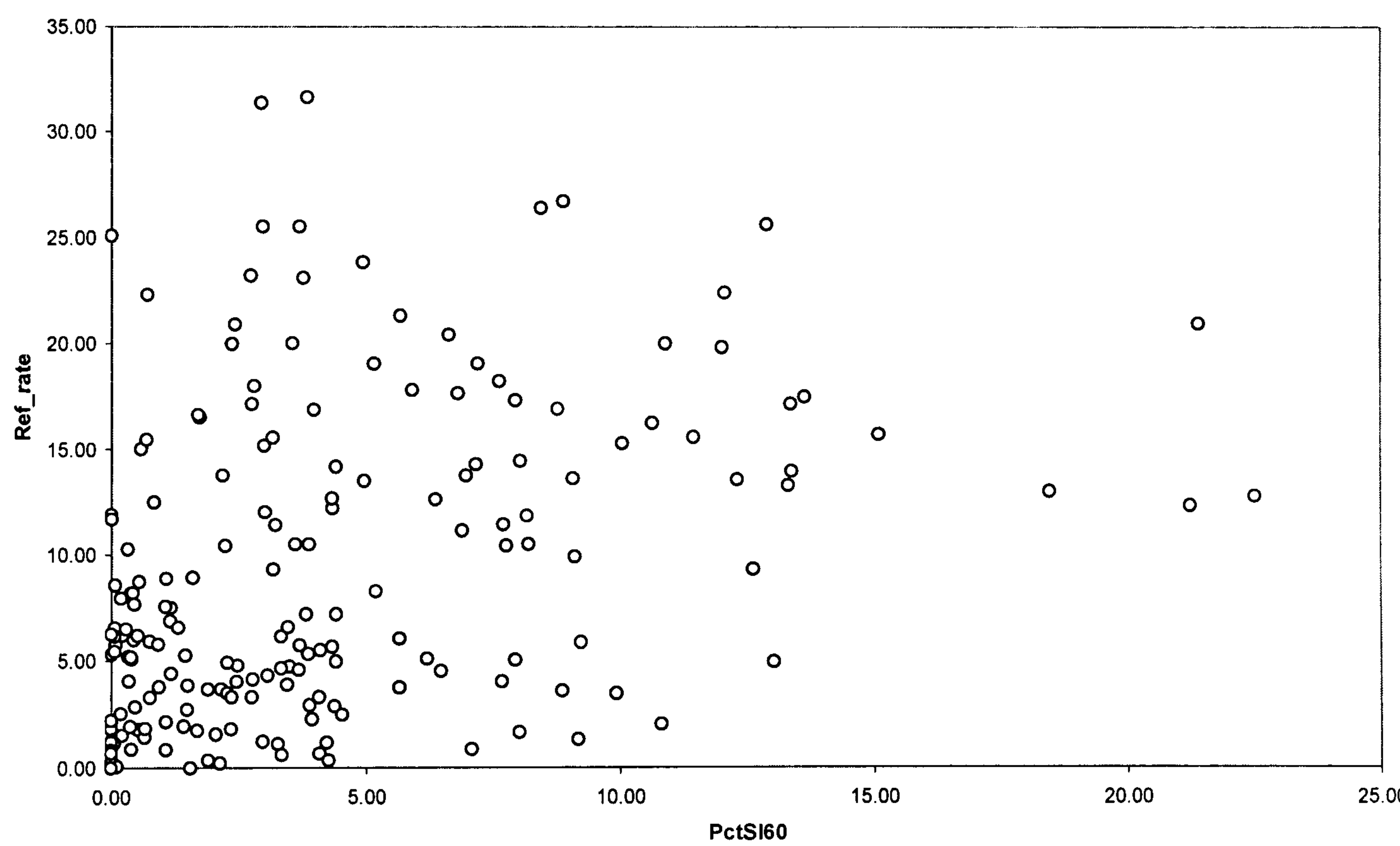


Figure G-48. Scatter plot for the percentage of forestry land with no forest cover afforested and PctSI60

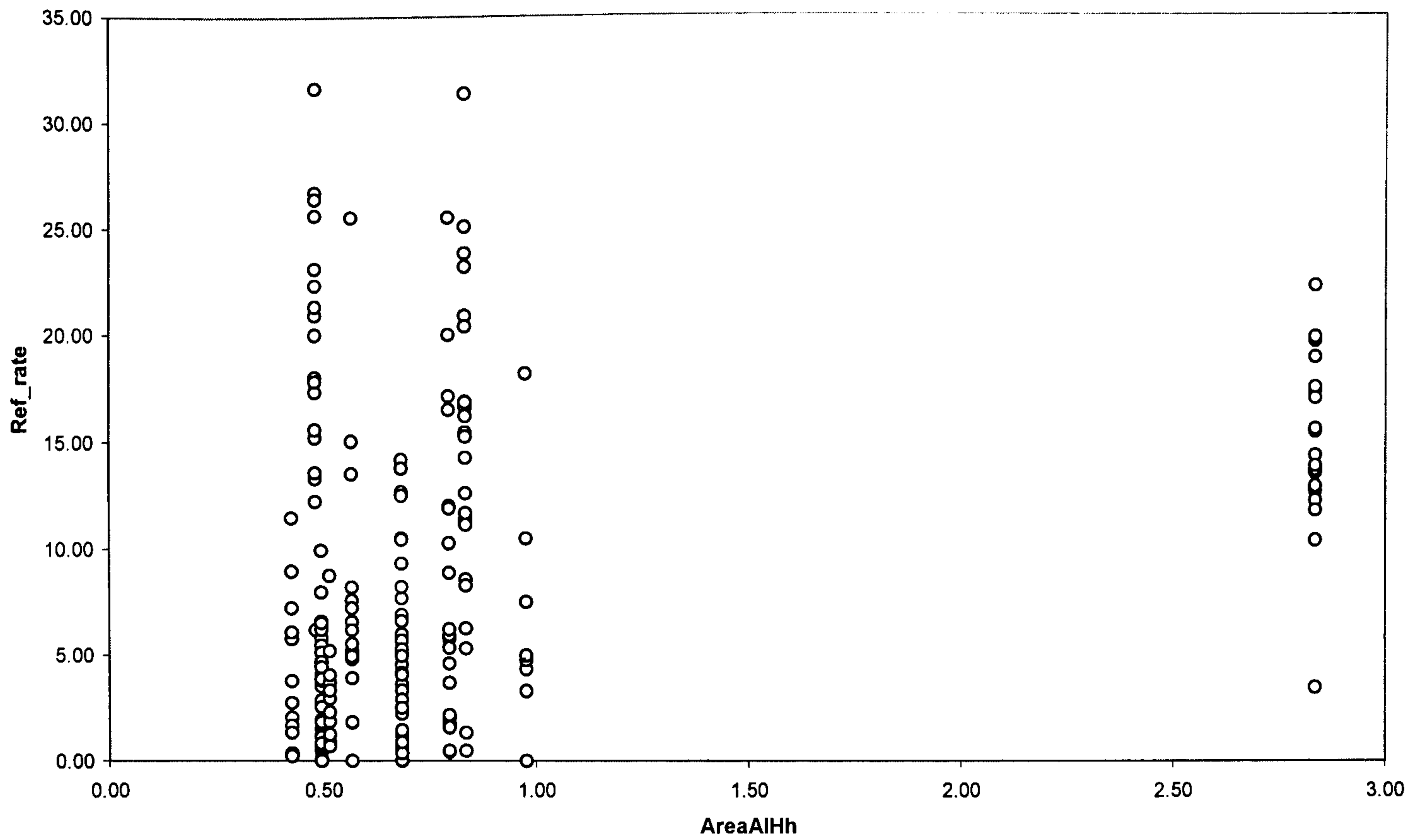


Figure G-49. Scatter plot for the percentage of forestry land with no forest cover afforested and AreaAlHh

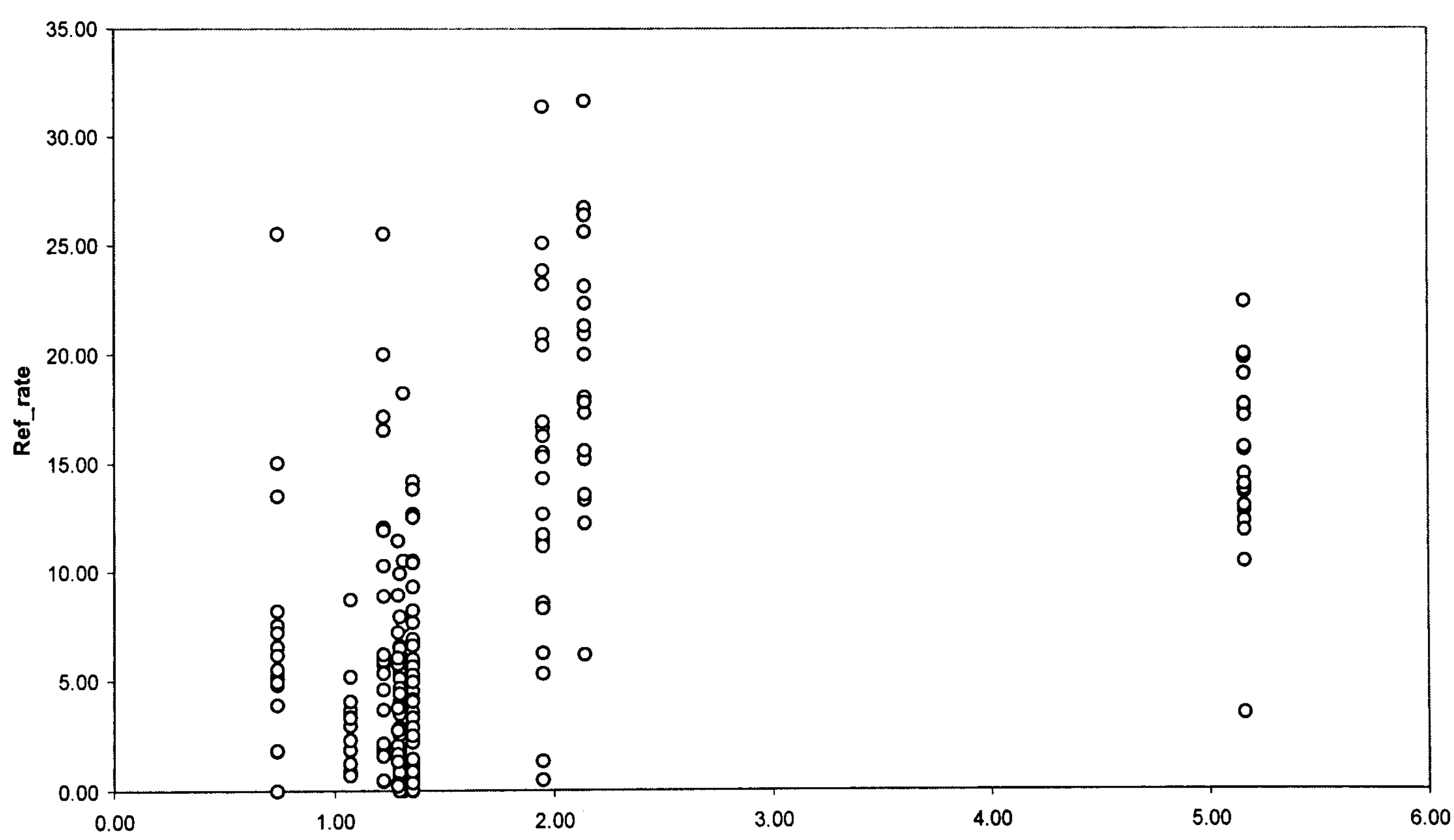


Figure G-50. Scatter plot for the percentage of forestry land with no forest cover afforested and AreaAlCH

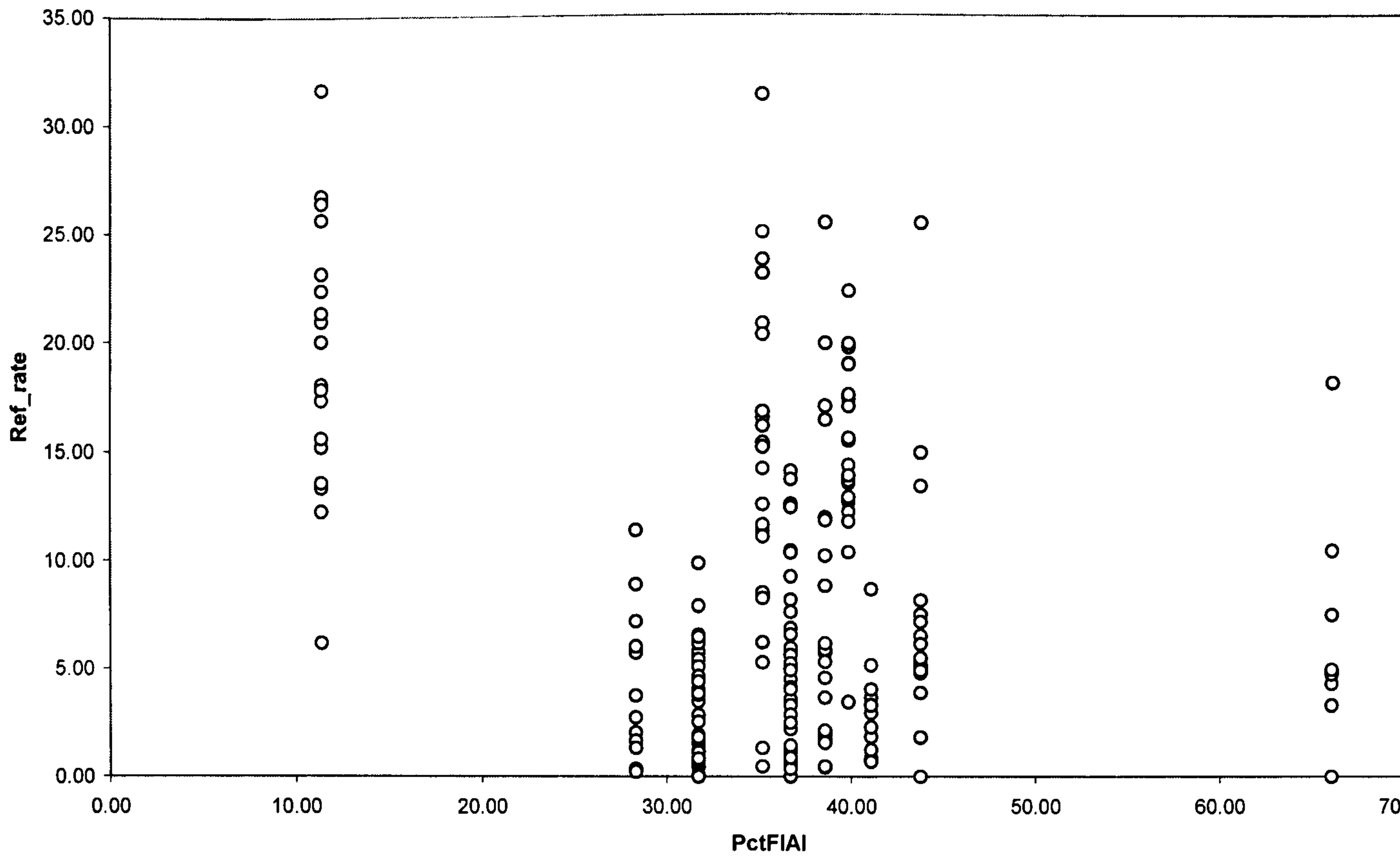


Figure G-51. Scatter plot for the percentage of forestry land with no forest cover afforested and PctFIAI

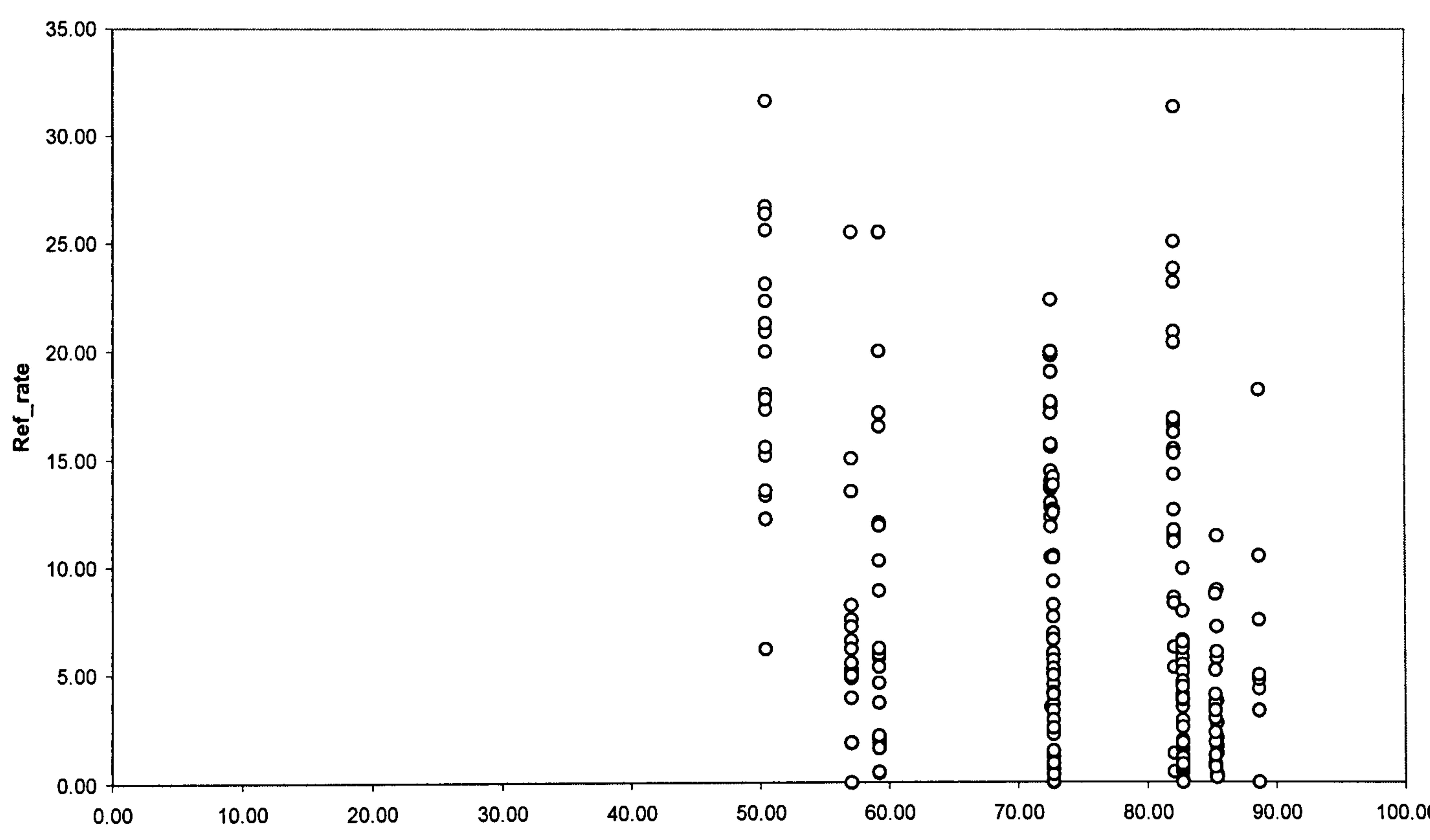


Figure G-52. Scatter plot for the percentage of forestry land with no forest cover afforested and PctFIAC

Annex H. Correlation matrix, Pearson's correlation coefficients for all independent variables

	PopDens	P0	PctKinh	PctMuong	PctTay	PctThai	DstHanoi	DstHoaB	SFE	DstSFE	WoodInd	DstWdInd	DstRdLog	DstAllrd	DstHighw	DstMnRd	AreaAgHh	AreaFlHh	AreaWrHh	AreaAlHh	PctFLAl	AreaAlCH	PctFLAC	AreaFSHh	PctSl35	PctSl60
PopDens	1.00																									
P0	-0.45	1.00																								
PctKinh	0.34	-0.73	1.00																							
PctMuong	0.08	0.33	-0.47	1.00																						
PctTay	-0.22	0.18	-0.15	-0.46	1.00																					
PctThai	-0.15	-0.08	-0.08	-0.51	-0.07	1.00																				
DstHanoi	-0.34	0.35	-0.30	-0.31	0.26	0.42	1.00																			
DstHoaB	-0.06	0.18	0.11	-0.14	0.05	0.08	0.35	1.00																		
SFE	0.03	-0.04	0.01	-0.08	-0.09	0.21	0.21	-0.12	1.00																	
DstSFE	0.01	-0.15	0.28	-0.17	0.24	-0.26	-0.42	0.36	-0.49	1.00																
WoodInd	0.13	-0.45	0.28	-0.08	-0.09	-0.11	-0.25	-0.60	0.03	-0.14	1.00															
DstWdInd	0.09	0.14	0.18	0.13	-0.05	-0.26	0.06	**0.88**	-0.13	0.36	-0.51	1.00														
DstRdLog	0.06	0.14	0.09	0.15	-0.30	0.06	0.31	**0.81**	0.03	-0.09	-0.49	**0.81**	1.00													
DstAllrd	-0.50	0.11	-0.19	-0.34	0.33	0.29	0.30	-0.22	-0.10	-0.01	0.15	-0.43	-0.38	1.00												
DstHighw	-0.12	0.11	-0.11	-0.05	0.36	-0.22	0.32	0.15	-0.05	0.03	0.27	0.15	0.03	0.20	1.00											
DstMnRd	-0.49	0.38	-0.36	0.00	0.31	-0.07	0.27	-0.06	-0.18	-0.01	-0.01	-0.18	-0.17	0.46	0.40	1.00										
AreaAgHh	0.08	0.14	0.02	0.23	-0.16	-0.17	0.03	0.35	-0.02	-0.05	-0.16	0.45	0.48	-0.34	0.18	-0.06	1.00									
AreaFlHh	-0.61	0.35	-0.35	-0.16	0.37	0.13	0.43	-0.01	-0.09	0.03	-0.05	-0.19	-0.22	0.65	0.27	0.56	-0.26	1.00								
AreaWrHh	-0.22	0.14	-0.08	0.02	0.03	-0.06	0.14	-0.17	0.10	-0.11	0.05	-0.15	-0.20	0.19	0.10	0.16	-0.07	0.31	1.00							
AreaAlHh	-0.28	0.13	-0.18	-0.30	0.71	-0.15	0.26	-0.17	-0.07	0.17	0.10	-0.24	-0.50	0.49	0.50	0.46	-0.21	0.48	0.32	1.00						
PctFLAl	0.26	-0.26	0.18	0.27	0.10	-0.62	-0.51	-0.42	-0.12	0.19	0.55	-0.14	-0.40	-0.08	0.32	-0.01	-0.04	-0.15	0.07	0.26	1.00					
AreaAlCH	-0.37	0.21	-0.24	-0.41	0.69	0.08	0.50	-0.01	-0.02	0.06	-0.07	-0.19	-0.33	0.54	0.43	0.46	-0.21	0.55	0.32	**0.94**	-0.05	1.00				
PctFLAC	0.17	0.01	0.10	0.32	0.00	-0.50	0.05	0.31	-0.03	-0.07	-0.02	0.54	0.48	-0.30	0.32	-0.04	0.27	-0.16	0.01	0.02	0.38	-0.02	1.00			
AreaFSHh	-0.38	0.23	-0.23	0.02	0.11	0.04	0.35	0.07	-0.10	-0.09	-0.10	-0.04	0.04	0.21	0.19	0.45	0.01	0.57	0.30	0.19	-0.15	0.27	0.02	1.00		
PctSl35	-0.50	0.18	-0.26	-0.37	0.50	0.18	0.29	-0.24	-0.07	0.09	0.20	-0.43	-0.49	0.81	0.27	0.46	-0.37	0.65	0.16	0.63	0.03	0.65	-0.25	0.18	1.00	
PctSl60	-0.37	0.10	-0.13	-0.40	0.40	0.28	0.41	0.13	-0.04	0.16	-0.11	-0.09	-0.13	0.55	0.15	0.30	-0.14	0.47	0.12	0.49	-0.20	0.59	-0.12	0.32	0.65	1.00

Figures in bold indicate a strong correlation.

Annex I. Scatter-plot matrixes for independent variables – Spatial regression analysis of forest cover change in Hoa Binh Province

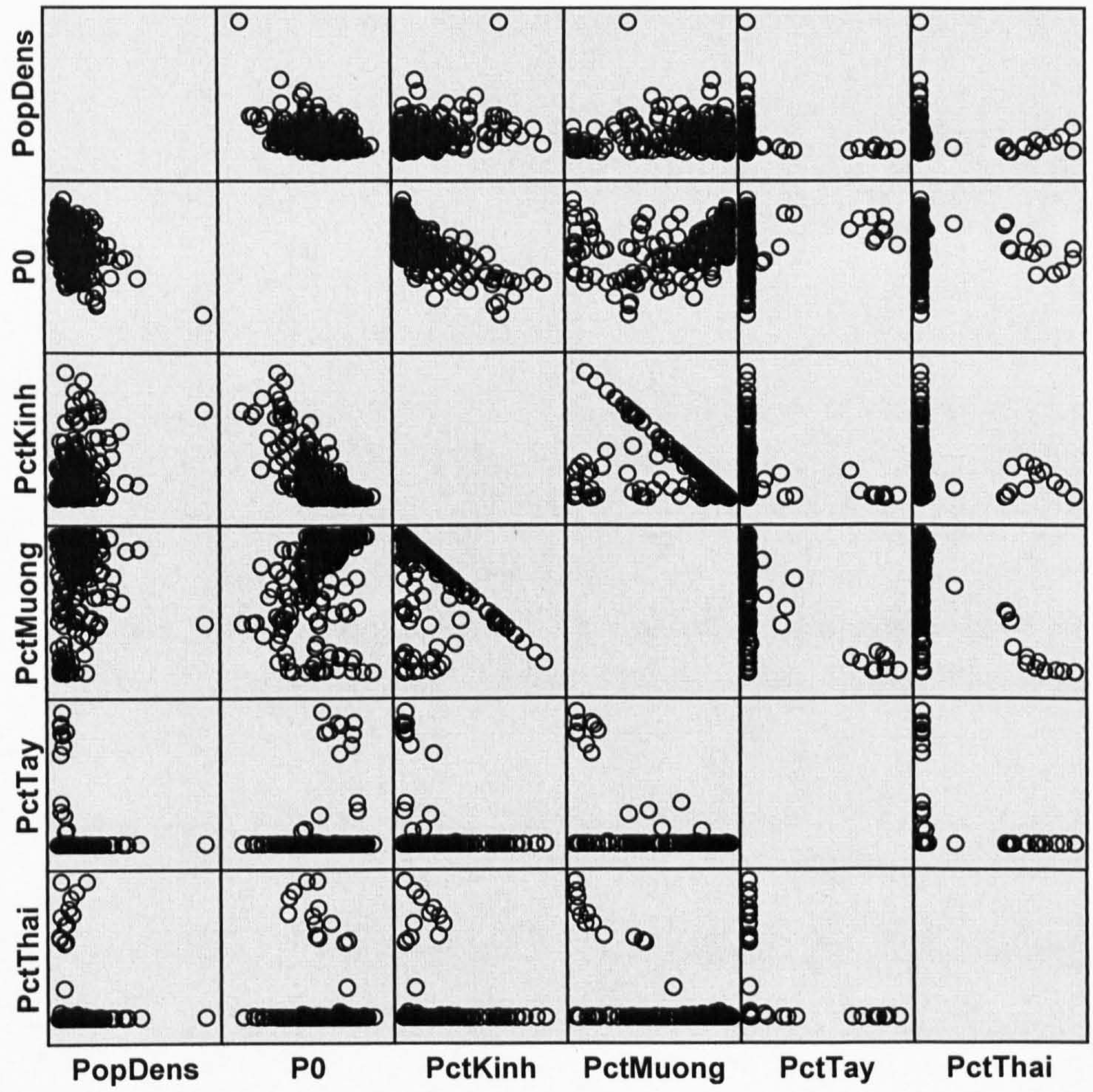


Figure I-1. Scatter-plot matrix for social variables

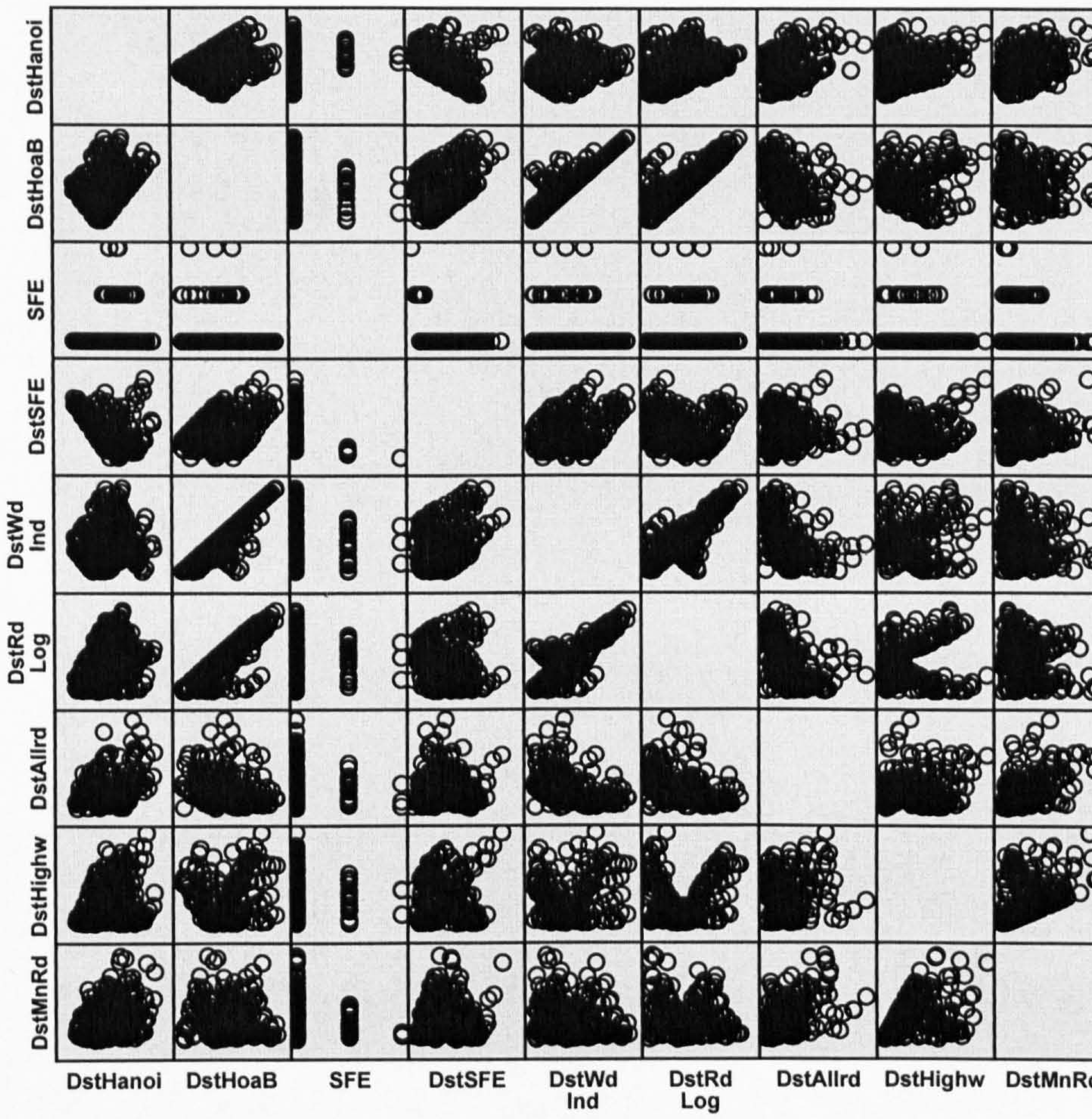


Figure I-2. Scatter-plot matrix for economic variables

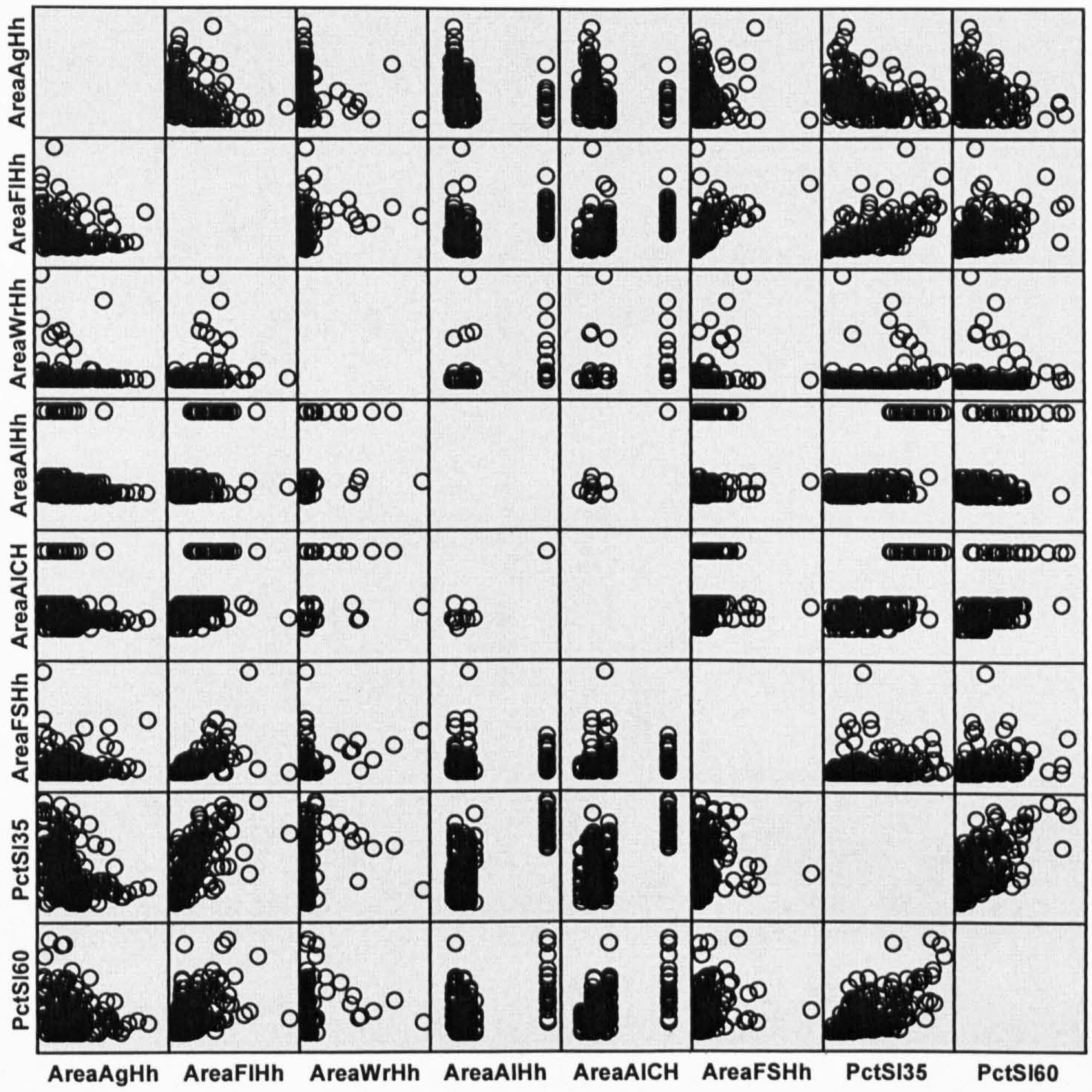


Figure I-3. Scatter-plot matrix for variables related to households' physical and institutional assets and physical variables

Annex J. Results of the spatial regression analysis of forest cover change in Hoa Binh Province

Table J-1. Results of the global and local regression models tested for each scenario of deforestation

Name model	Scenario	Parameter	AIC (GR)	R^2 (GR)	Parameter estimate <0 and t <-1.99	Parameter estimate >0 and t >1.99	AIC (GWR)	R^2 (GWR)
Def_1	Agricultural expansion	P0 AreaAgHh	1836.63	0.16	P0	AreaAgHh	1765.70	0.64
Def_2		P0 AreaAgHh PopDens	1816.58	0.24		AreaAgHh PopDens	1750.19	0.74
Def_3		AreaAgHh PopDens	1816.68	0.24		AreaAgHh PopDens	1741.90	0.72
Def_4	Timber demand	DstHanoi DstSFE DstWdInd DstAllrd DstHighw DstMnRd	1778.58	0.39	DstHanoi DstAllRd	DstWdInd	1761.72	0.79
Def_5		DstHanoi SFE DstWdInd DstAllRd	1776.34	0.39	DstHanoi DstAllRd	DstWdInd	1733.57	0.78
Def_6		DstHanoi SFE DstRdLog DstAllRd	1784.27	0.38	DstHanoi DstAllRd	DstRdLog	1698.51	0.72
Def_7		DstHanoi DstRdLog DstAllRd	1782.14	0.37	DstHanoi DstAllRd	DstRdLog	1697.89	0.75
Def_8		DstHoaB DstRdLog DstAllRd	1799.64	0.31	DstAllRd		1702.83	0.70
Def_9		DstHanoi RdLogInt DstAllRd	1791.02	0.34	DstHanoi DstAllRd		1692.72	0.75
Def_10		DstHanoi WoodInd DstAllRd	1791.66	0.34	DstHanoi DstAllRd		1689.80	0.75
Def_11	Shifting cultivation	PctKinh	1854.94	0.07		PctKinh	1745.76	0.61
Def_12		PctMuong	1864.48	0.02		PctMuong	1745.49	0.65
Def_13		PctTay	1862.06	0.03	PctTay		1804.96	0.30
Def_14		PctThai	1855.90	0.06	PctThai		1791.36	0.48
Def_15		PctKinh PctTay PctThai	1837.29	0.16	PctTay PctThai	PctKinh	1789.27	0.41

Source: this study

Table J-2. Results of the global and local regression models combining scenarios of deforestation

Name model	Parameter	AIC (GR)	R^2 (GR)	Parameter estimate<0 and t <-1.99	Parameter estimate>0 and t >1.99	AIC (GWR)	R^2 (GWR)
Def_16	PctKinh AreaAgHh PopDens DstHanoi WoodInd DstAllRd	1780.82	0.38	DstHanoi DstAllRd	AreaAgHh	1709.51	0.73
Def_17	DstHanoi AreaAgHh DstAllRd	1783.46	0.36	DstHanoi DstAllRd	AreaAgHh	1729.97	0.75
Def_18	DstRdLog DstHanoi AreaAgHh DstAllRd	1780.86	0.37	DstHanoi DstAllRd	DstRdLog	1727.71	0.71
Def_19	WoodInd DstHanoi AreaAgHh DstAllRd PctKinh	1782.12	0.37	DstHanoi DstAllRd	AreaAgHh PctKinh	1747.91	0.73
Def_20	PctSl35	1798.73	0.30	PctSl35		1710.06	0.72
Def_21	PctSl60	1836.79	0.15	PctSl60		1773.29	0.70
Def_22	DstHanoi WoodInd DstAllRd PctSl35	1785.44	0.36	PctSl35 DstHanoi DstAllRd		1692.55	0.75
Def_23	DstHanoi DstAllRd	1789.55	0.34	DstHanoi DstAllRd		1689.01	0.78

Source: this study

Table J-3. Results of the global and local regression models tested for each scenario of afforestation

Name model	Scenario	Parameter	AIC (GR)	R^2 (GR)	Parameter estimate <0 and t <-1.99	Parameter estimate >0 and t >1.99	AIC (GWR)	R^2 (GWR)
Ref_Final1	FLA	AreaAlHh	1741.13	0.02		AreaAlHh	1673.73	0.43
Ref_Final2		PctFlAC	1725.42	0.10	PctFlAC		1638.79	0.53
Ref_Final3		PctFlAl	1719.54	0.12	PctFlAl		1644.04	0.49
Ref_Final4	Timber demand	DstHanoi DstSFE DstWdInd DstAllrd DstHighw DstMnRd	1669.44	0.34	DstHighw DstWdInd	DstHanoi	1703.27	0.51
Ref_Final5		DstHanoi DstWdInd DstHighw	1676.87	0.30	DstHighw DstWdInd	DstHanoi	1657.03	0.48
Ref_Final6		DstHanoi WoodInd DstHighw	1693.86	0.24	DstHighw	DstHanoi WoodInd	1634.84	0.50
Ref_Final7		DstHanoi WoodInd DstHigh DstSFE	1692.75	0.25	DstHighw	DstHanoi WoodInd	1647.50	0.47
Ref_Final8		DstHanoi WoodInd DstHigh SFE	1695.93	0.24	DstHighw	DstHanoi WoodInd	1644.01	0.47
Ref_Final9		DstHanoi DstRdLog DstHigh	1677.75	0.30	DstHighw DstRdLog	DstHanoi	1674.32	0.43
Ref_Final10	Annual cropping not viable	AreaFSH	1728.67	0.08		AreaFSH	1650.11	0.43
Ref_Final11		AreaFSH AreaAlHh	1727.65	0.09		AreaFSH	1650.03	0.44
Ref_Final12		AreaFSH PctSl35	1701.47	0.21		AreaFSH PctSl35	1655.79	0.43
Ref_Final13		DstHanoi	1710.00	0.17		DstHanoi	1652.66	0.47
Ref_Final14	Urbanisation	DstHoaB	1745.21	0.00			1655.20	0.47
Ref_Final15		DstHanoi DstAllRd DstHighw DstMnRd	1679.02	0.30	DstHighw	DstHanoi DstAllRd	1679.17	0.43

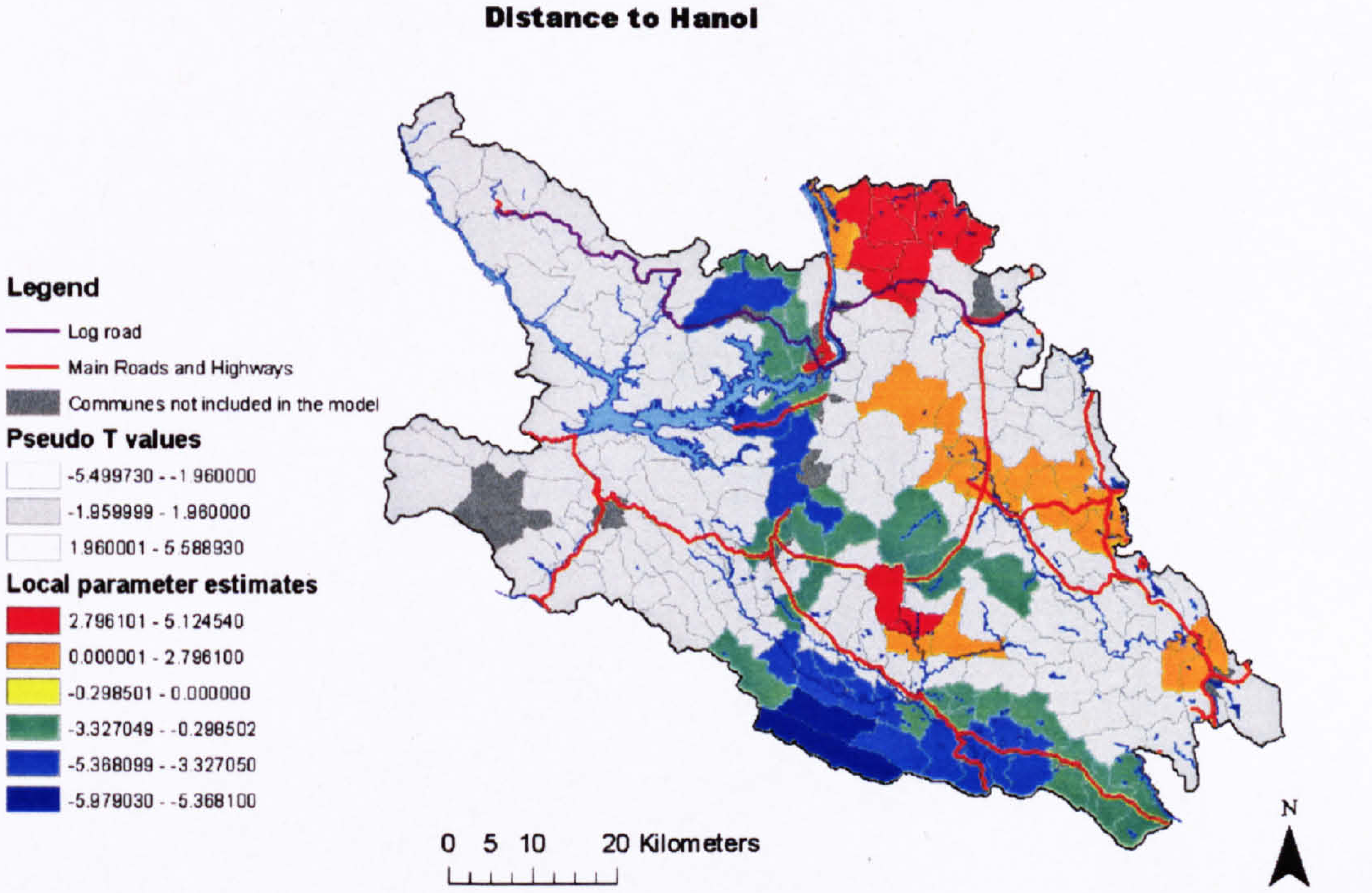
Source: this study

Table J-4. Results of the global and local regression models combining scenarios of reforestation

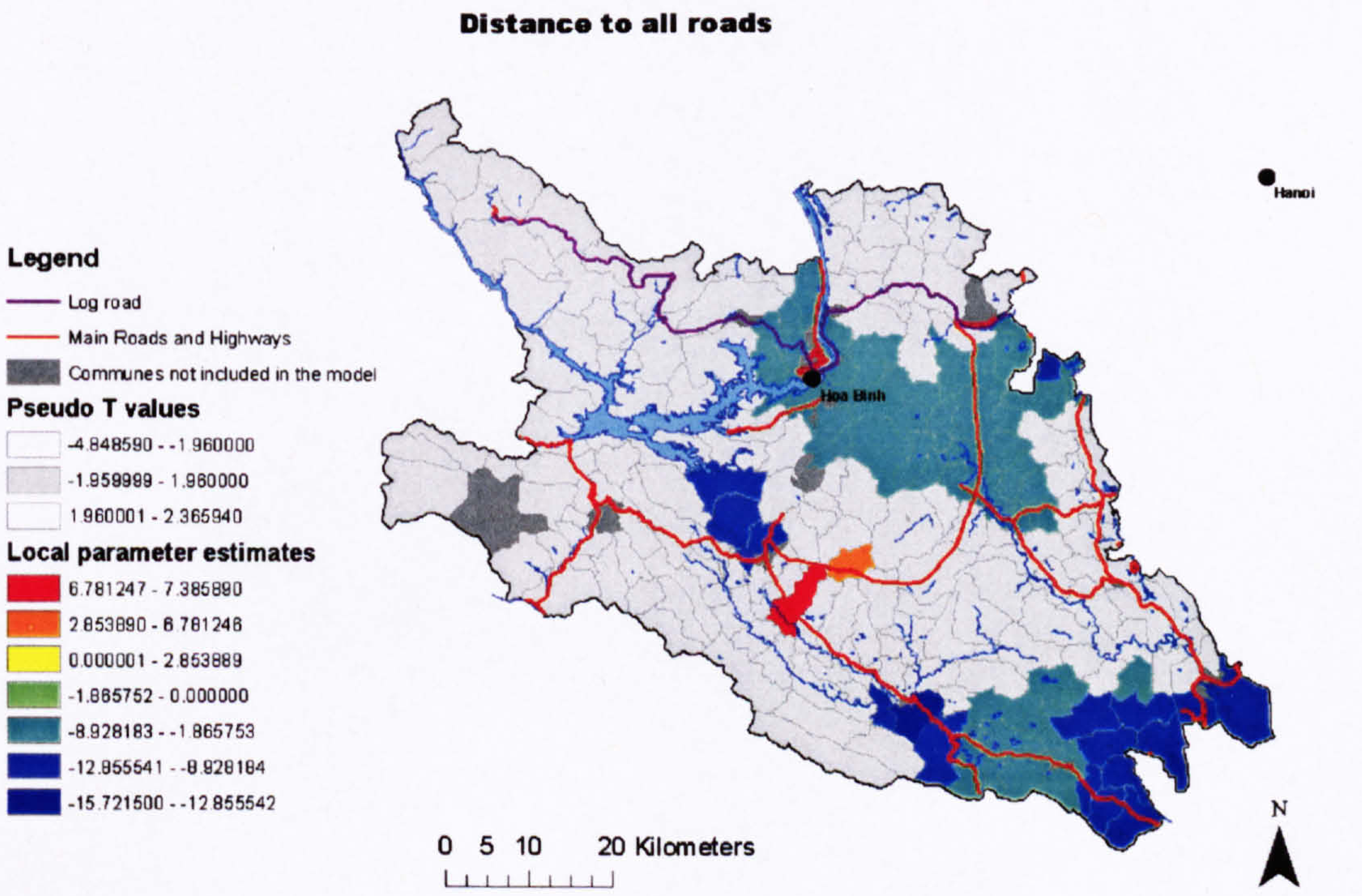
Name model	Parameter	AIC (GR)	R^2 (GR)	Parameter estimate<0 and t <-1.99	Parameter estimate >0 and t >1.99	AIC (GWR)	R^2 (GWR)
Ref_Final16	PctFlAc SFE DstHanoi WoodInd DstHighw AreaFSHh PctSl35	1657.76	0.38	DstHighw PctFlAc	DstHanoi WoodInd AreaFSHh PctSl35	1652.46	0.46
Ref_Final17	PctFlAC DstHanoi WoodInd DstHighw AreaFSHh PctSl35	1656.46	0.38	DstHighw PctFlAC	DstHanoi WoodInd AreaFSHh PctSl35	1652.21	0.47
Ref_Final18	PopDens P0 PctFlAC DstHanoi WoodInd DstHighw AreaFSHh PctSl35	1646.13	0.42	PopDens DstHighw PctFlAC	DstHanoi WoodInd	1567.90	0.72
Ref_Final19	PopDens PctFlAC DstHanoi WoodInd DstHihgw	1646.63	0.41	PopDens DstHighw PctFlAC	DstHanoi WoodInd	1570.73	0.69

Source: this study

Annex K. Surface of local parameter estimates for deforestation, models E and F

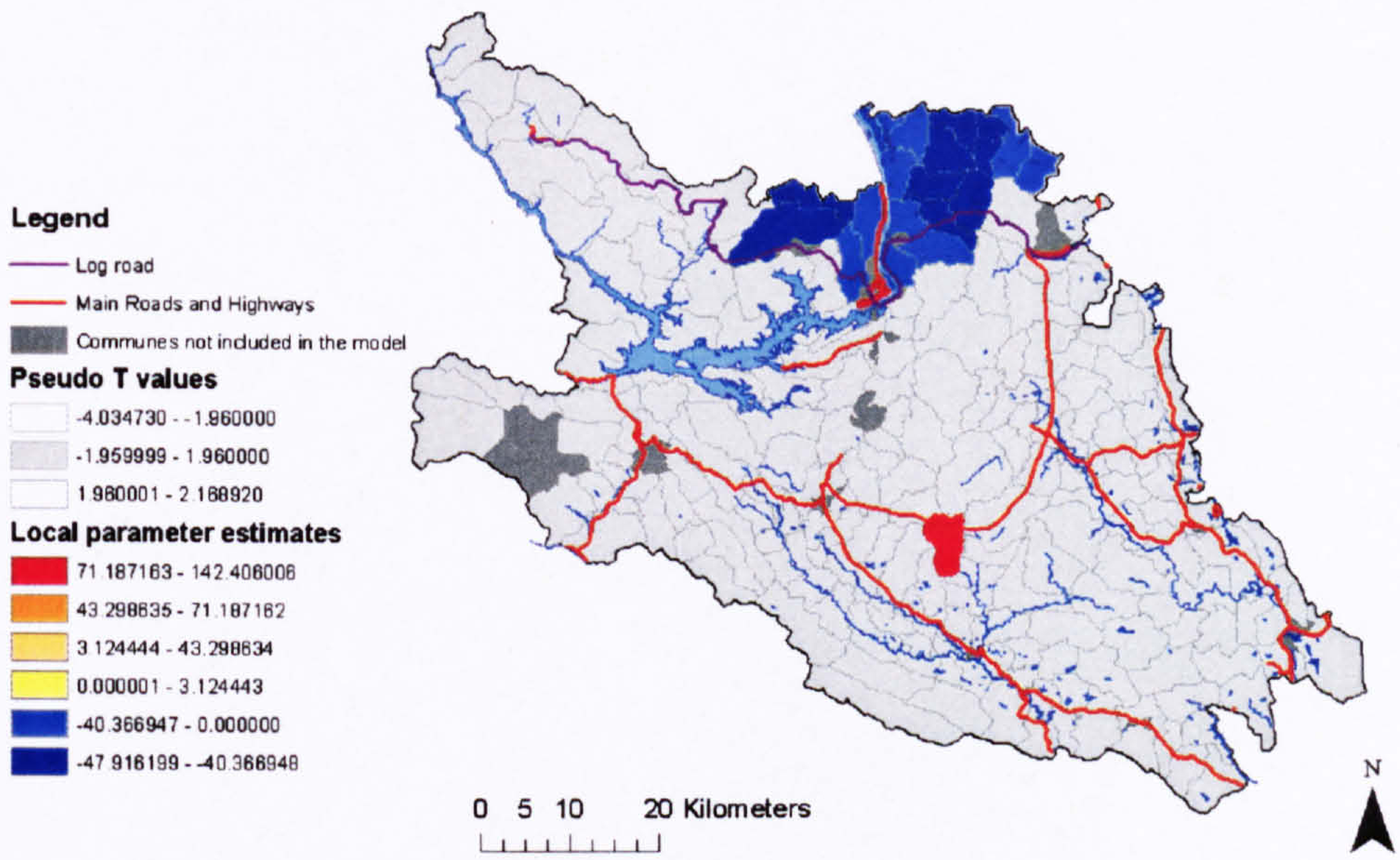


Map K-1. Surface of local parameter estimates associated with DstHanoi in deforestation, model E



Map K-2. Surface of local parameter estimates associated with DstAllrd in deforestation, model E

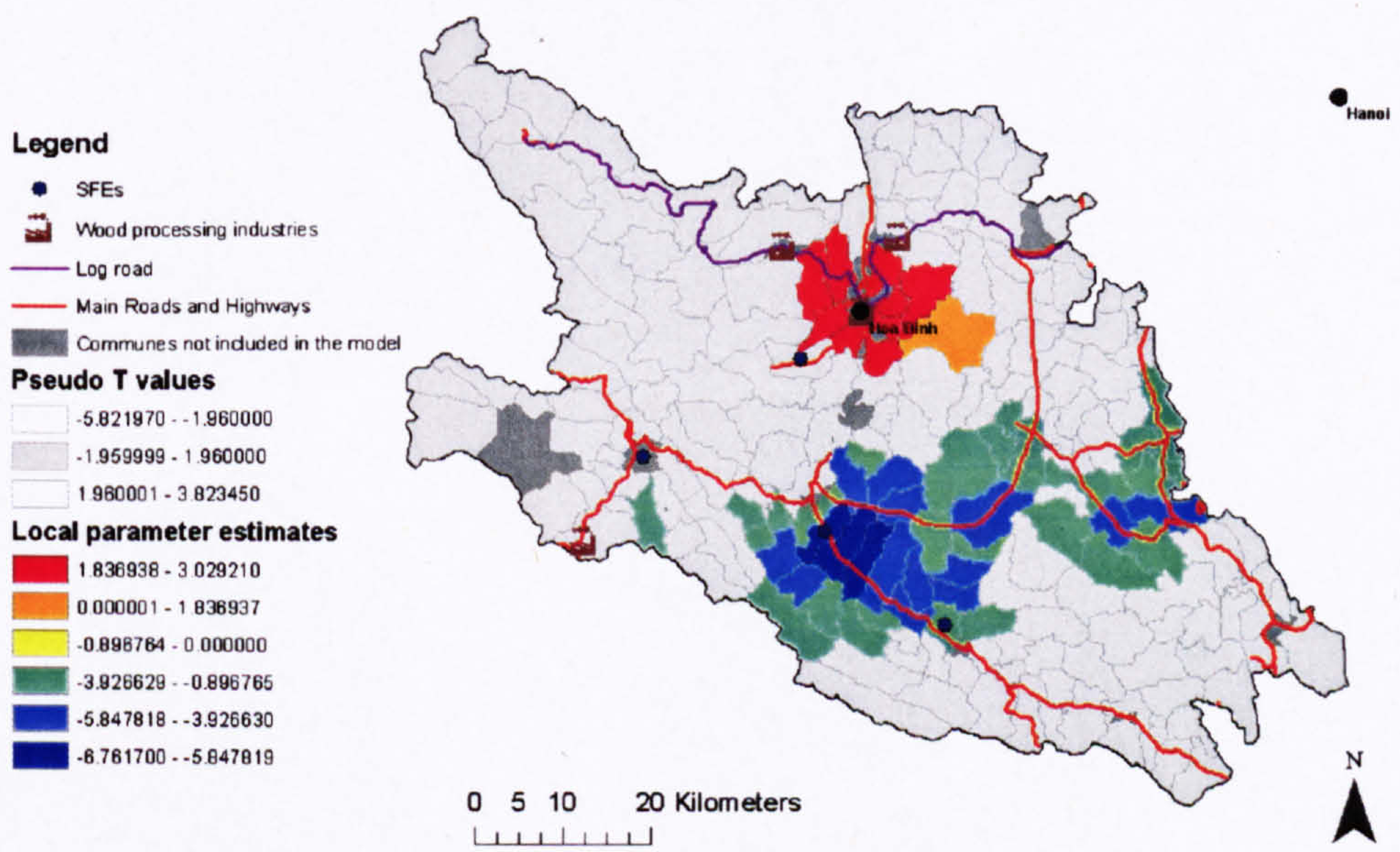
Presence or Proximity of a Wood Industry



Map K-3. Surface of local parameter estimates associated with WoodInd in deforestation, model E

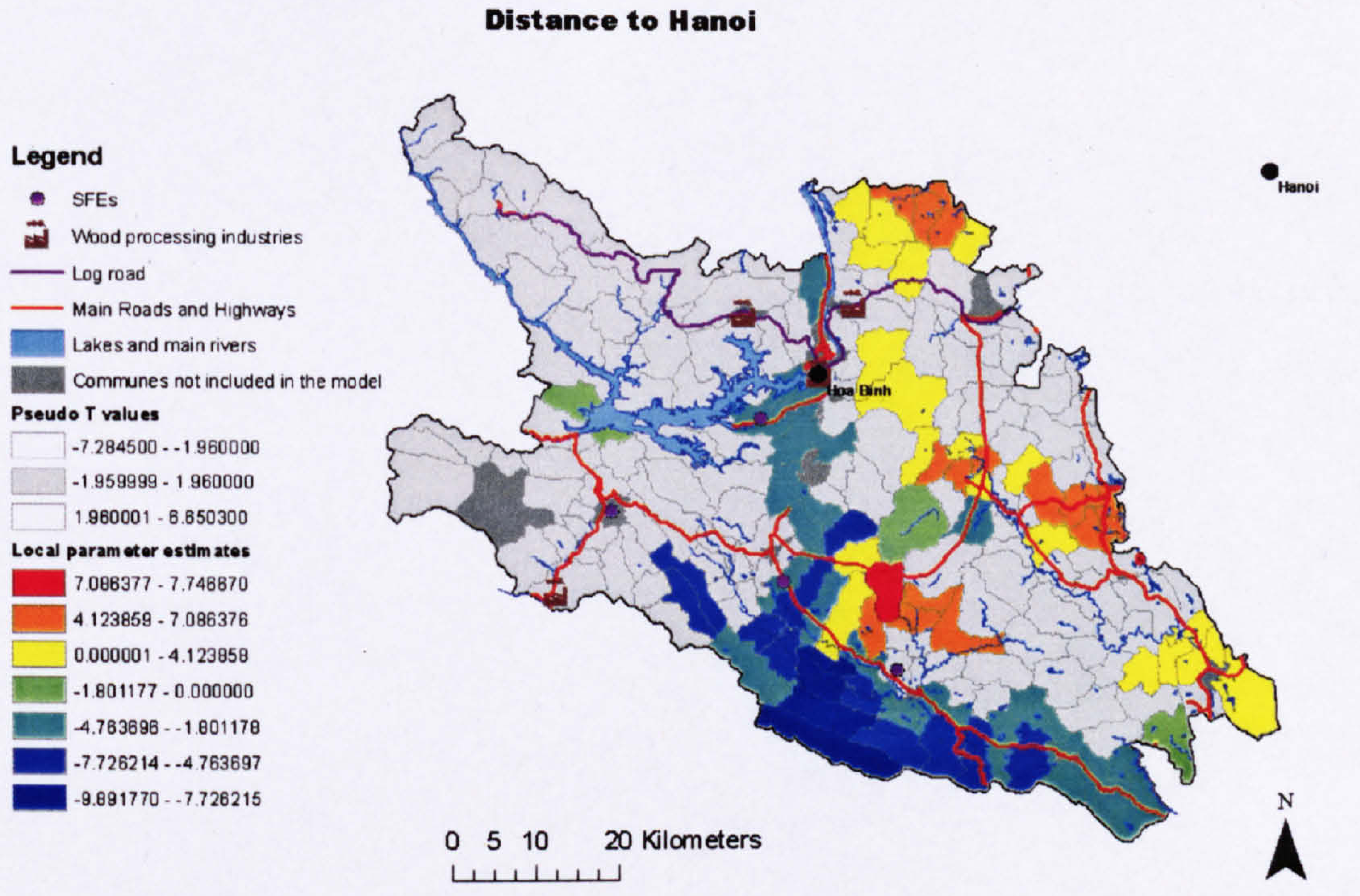
The map shows a negative correlation between WoodInd and forest cover loss. One would expect that the area of forest lost is greater close to wood processing industries (timber demand scenario). The model might capture the effect of a variable that was not taken into account in the model.

Percentage of land area with slope between 25 and 35 degrees

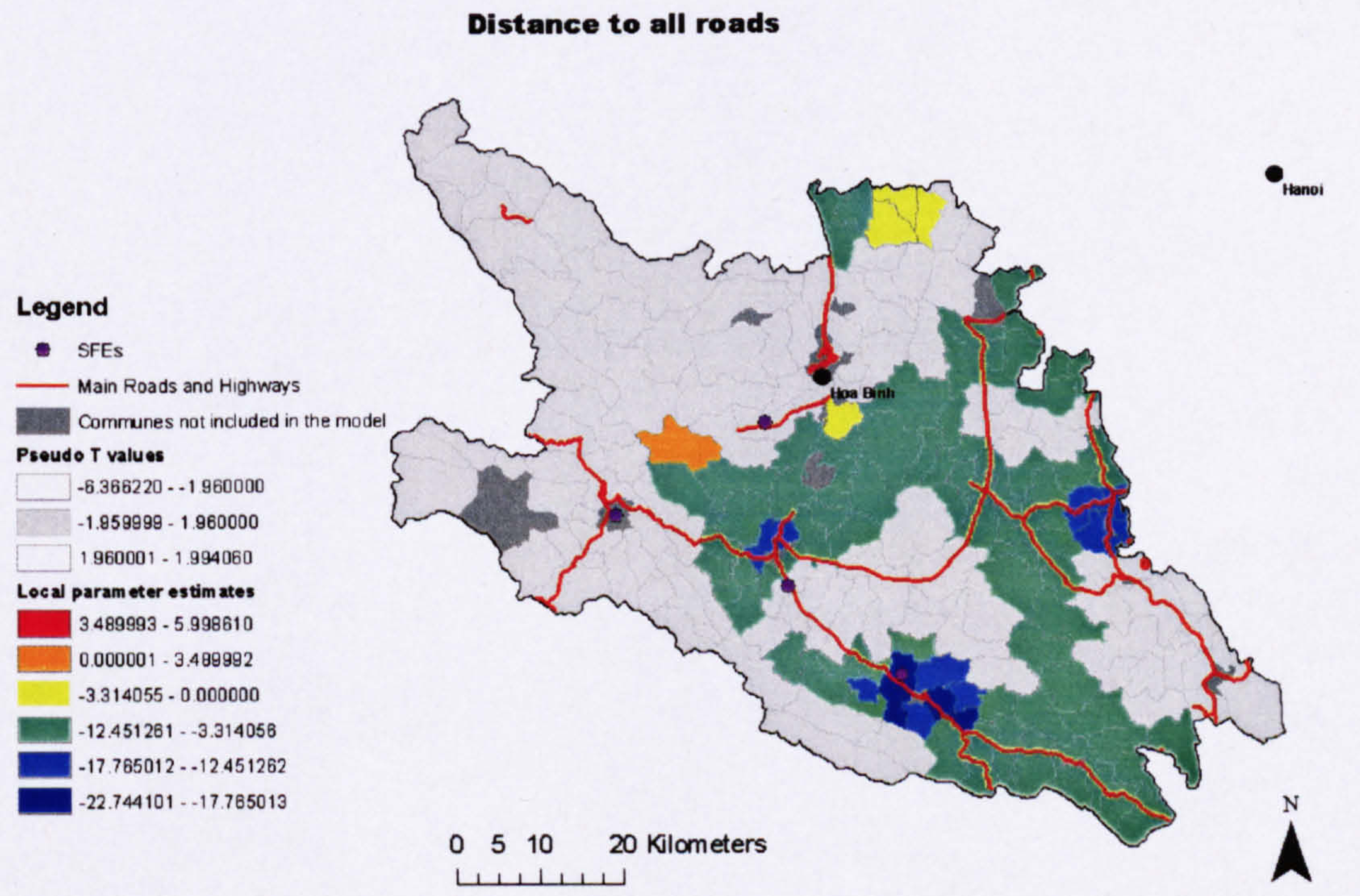


Map K-4. Surface of local parameter estimates associated with PctSl35 in deforestation, model E

The map shows a unexpected negative correlation between PctSl35 and the dependent variable around Hoa Binh. The model might capture in this area the effect of urbanisation that was not fully taken into account in the model.



Map K-5. Surface of local parameter estimates associated with DstHanoi in deforestation model F



Map K-6. Surface of local parameter estimates associated with DstAllrd in deforestation model F

Annex L. List of civil servants interviewed, DARD, DONRE and FPD. Provinces of Hoa Binh, Yen Bai, Son La, and Thai Nguyen, Vietnam, July - August 2006

Table L-1. List of civil servants interviewed in the provincial departments of Hoa Binh, Yen Bai, Son La and Thai Nguyen Provinces

Province	Organisation	Name	Position	Date of the interview
Hoa Binh	DARD	Mr Long	Deputy Director	12/07/06
Hoa Binh	DARD	Mrs Xuan	Head of the Planning and Investment Section	12/07/06
Hoa Binh	DARD – Forestry sub-Department	Mr Chuc	Director	12/07/06
Hoa Binh	FPD	Mr Kien	Head of the Forest Protection and Management Section	13/07/06
Yen Bai	DARD	Mr Hoang	Head of the Policy Section	17/07/06
Yen Bai	DARD – Forestry sub-Department	Mr Huu	Deputy Director	17/07/06
Yen Bai	DONRE	Mr Tinh	Deputy Head of the Land Titling Section	19/07/06
Yen Bai	DONRE	Mr Kiem	Head of the Land Planning Section	19/07/06
Yen Bai	FPD	Mr Thanh	Head of the Forest Management Section	18/07/06
Yen Bai	FPD	Mr Thuong	Deputy Head of the Forest Management Section	18/07/06
Sơn La	DARD	Mr Hung	Head of the Technical Section	26/07/06
Sơn La	DARD – Forestry sub-Department	Mr Hung	Deputy Director	26/07/06
Sơn La	FPD	Mr Luan	Deputy Director (in charge of FLA)	27/07/06
Son La	FSIV	Mr Dung	Director	26/07/06
Son La	FSIV	Mr Muon	Deputy Director	26/07/06
Thai Nguyen	DARD	Mr Dinh	Deputy Director	01/08/06
Thai Nguyen	DARD	Mr Hoa	Head of the Soils Section	01/08/06
Thai Nguyen	DONRE	Mr Hai	Head of the Land Titling Section	02/08/06
Thai Nguyen	DONRE	Mr Anh	Technical Officer - Land Titling Section	02/08/06
Thai Nguyen	DONRE	Mr Lieu	Deputy Head of the Land Management Section	02/08/06
Thai Nguyen	FPD	Mr Canh	Deputy Head of the Forest Management Section	03/08/06

Annex M. Guide for interviews of civil servants, DARD, DONRE and FPD. Provinces of Hoa Binh, Yen Bai, Son La, and Thai Nguyen, Vietnam – July - August 2006

This document presents a list of the key themes and related questions prepared for the interviews of the civil servants in the DARD, DONRE and FPD of the provinces of Hoa Binh, Yen Bai, Son La and Thai Nguyen. All questions listed below were not necessarily asked during each interview. Questions were selected during the interview depending on the Department and on its role regarding FLA and the implementation of the 5MHRP. Interviews always started with an introduction explaining the research scope and aims, and the objectives, proposed duration and course of the interview.

Perception of land degradation / Land use

- How would you define land quality in the uplands? How has it evolved? Has there been any study conducted on land degradation in the province?
- Is land use spatially homogenous over the province? What are the main current land uses? How has land use evolved? Why? According to you, which factors do impact on land use in the uplands?
- Has increase in forest cover been continuous over time or has it occurred over few short-time periods?

Land allocation process

- Could you explain me how land allocation has been implemented?
- When did FLA start? Has it been completed? Is the province rather in advance / late compared to other northern provinces regarding land allocation? Could you draw a diagram of the organisations in charge of FLA with their role? Who provides the budget for land allocation?
- What are the main objectives of land allocation?
- What were the limiting factors for its implementation?
- Which factors facilitated its implementation?
- Who was in charge of monitoring results at the provincial level? To whom were results sent?
- Have some districts been quicker than others? Why?
- Have you allocated land to communities? Why?
- Has land allocation had an impact on land use in the province?

Afforestation programmes

- Has the province been very affected by deforestation? What have been the major causes of deforestation?
- Why is it important to afforest?
- Who decides on the afforestation targets? Upon which criteria are reforestation targets fixed?
- How has the 5MHRP been implemented? Could you draw a diagram of the organisations in charge of the implementation of the 5MHRP with their role and budget flow.
- Which tree species are planted under the 5MHRP?
- What have been the limiting factors for its implementation?
- Which factors facilitated its implementation?
- How do you evaluate the impact of the programme? Who is in charge of monitoring results? To whom are results sent?
- Are there any donors' projects linked to afforestation in the province?
- Are there links between afforestation programmes and other central policies?

Forestry sector

- How important is the forestry sector in the province? How has it evolved for the past 20 years? Will it become important in the future? Today, how many wood processing industries run in the province? Since when have these factories run? Where is the wood/paper/woodchip exported?
- What is the extent of the forest area managed by SFEs? How many people are employed by SFEs in the province? How has this figure evolved? Have you started to implement the SFE reform?
- How many private companies are involved in forestry in the province?
- What is the impact of the Bai Bang paper mill on the forestry sector in the province?

Closing up the interview

- For how long have you been working in the Department?
- Where do you come from, are you born in the province?

Annex N. List of persons interviewed for the policy-process analysis. Hanoi, Vietnam, March – September 2006

Table N-1. List of persons interviewed, position and date of interviews

Organisation	Name	Position	Date interview
ADB	Mr. Ian B. Fox	Head - Agriculture, Rural Development and Natural Resources	24/09/06
Agence Française de Développement (AFD) French Development Agency	Mr. Didier Baillet	Head of Agriculture and Rural Development section	07/06/06
Agrifood Consulting	Mrs. Elise Pinners	Research Fellow	31/08/06
CIFOR and World Agroforestry Centre (ICRAF)	Dr. Minh Ha Fagerstrom	Country representative	22/03/06
European Union. Delegation of the European Commission to Vietnam	Mr. Hoang Thanh	Program Officer, Rural Development and Environment Co-operation Section	21/07/06
Fauna and Flora International (FFI)	Dr. Mark Infield	Director	31/08/06
Finland Embassy	Mr. Le Quoc Hung	Program Officer	18/08/06
	Mr. Kari Mukala	Counsellor	18/08/06
Forest Inventory and Planning Institute - Forest Resources and Environment Center	Dr. Nguyen Huy Dung	Deputy-director	28/03/06
FSSP Coordination Office	Dr. Paula Williams	Chief Technical Advisor	27/06/06
GFA Terra Systems Consulting Group	Dr. Joachim-F. Kirchhoff	Chief Technical Advisor – MARD Project afforestation in Thanh Hoa and Nghe An provinces	13/09/06
Groupe de Recherche et d'Echange Technologiques (GRET)	Mr. Damien Thibault	Country representative	11/05/06
GTZ	Dr. Laslo Pancel	Forestry Engineer, Chief Technical Advisor	22/08/06
Hanoi Agricultural University - Center for Agricultural Research and Ecological Studies	Dr. Nguyen Thanh Lam	Senior Researcher	17/03/06
	Dr. Tran Duc Vien	Director	31/03/06
Helvetas	Mrs. Franziska Votgli	Extension Services and Training Project officer	28/03/06
SFRI	Dr. Tran Duc Toan	Vice Director	14/06/06
	Prof. Thai Phien	Ex-coordinator research network ASIALAND	23/08/06
IPSARD	Mrs. Carole Ly	Technical advisor	17/03/06
Japan International Cooperation Agency (JICA)	Mr. Oda Kensei	Expert (forestry)	13/06/06
Japan International Volunteer Centre (JVC)	Ms. Mayu Ino	Country representative	8/02/06

Table N-1 continued

Organisation	Name	Position	Date interview
MARD - Department of Forestry	Mrs. Le Thi Thua	Head of Planning Division	20/09/06
MARD - Legal Department	Dr. Pham Xuan Phuong	Deputy Director	27/09/07
Netherlands Development Organisation (SNV)	Mr. Nico Janssen	Project Officer	20/02/06
Northern Mountains Agricultural and Forestry Science Institute (NOMAFSI)	Dr. Le Quoc Doanh	Director	11/09/06
Northern Mountains Agricultural Research Center (NOMARC)	Dr. Dang Dinh Quang	Vice Director	8/08/06
Northern Mountains Poverty Reduction Project	Mr. Edwin Shanks	Chief Technical Advisor	29/03/06
Swedish International Agency for Development (SIDA)	Mr. Tran Nam Binh	Program Officer in Forestry	02/05/06
Sustainable Rural Development	Mrs. Vu Thi Bich Hop	Director	10/05/06
Swiss Agency for Development and Cooperation (SDC)	Dr. Michel Evequoz	First Secretary, Assistant Country Director	11/07/06
UK Department for International Development (DFID)	Mrs. Gita Sabharwal	Poverty and policy adviser	30/03/06
	Mrs. Than Thi Thien Huong	Social development adviser	30/03/06
University of Sidney	Mrs. Georgina Houghton	PhD student / consultant	15/09/06
UNDP	Mr. Nguyen Hai Nam	Programme Coordinator for the UNDP/EU Programme on Tropical Forest	16/04/06
VAAS	Prof. Nguyen Van Bo	President	20/12/06
Vietnam National University - Center for natural Resources and Environmental Studies	Dr Le Trong Cuc	Senior Researcher - Head of the upland working group	4/07/06
World Conservation Union (IUCN)	Mrs. Nguyen Thi Yen	Forests Program Officer	02/06/06
World Bank	Dr. Nguyen The Dung	Operations Officer - Rural Development	27/09/06
	Dr. Robin Mearns	Senior specialist - Rural Development and Natural Resources Management	21/12/06

Annex O. Themes explored during interviews for the policy-process analysis. Hanoi, Vietnam, March – September 2006

This document was used as a frame to guide interviews. Themes were usually discussed in the order presented below, but the order and the nature of the questions within each theme were flexible and adapted to the course of the discussion in order to keep the talk flowing. Each interview started with an introduction of the scope and aims of the research, objective and course of the interview.

THEMES EXPLORED WITH DONORS

Activities

- Presentation and history of your organisation's activities in Vietnam
- Relative involvement in Vietnam compared to other countries and to other donors
- Involvement in forest protection and forestry projects, history and reasons

Perception of the challenges in the northern uplands

- What are the challenges regarding land and water management in the northern uplands in the next coming years? Upon which piece of evidence do you base your argumentation?
- Are these challenges new? Is your perception of these challenges shared by other people in your organisation? By other organisations? By the GoV?
- Why has FLA been slower than agricultural land allocation?

Perception of forest and land degradation

- What do you think of land degradation extent in the northern uplands? Why is it important to afforest?

Policy changes

- In your opinion, why did the GoV decide to allocate forestry land to households?
- Why did the GoV decide to recognise communities as legal recipients of land use rights?
- Were there organisations or individuals that pushed towards this decision?
- What were the key events that resulted in a shift in policy and led to these decisions?
- What do you think of the benefits of the 5MHRP?

Policy links

- Do you have an example of how a donor impacted on policies or on the perception of a problem (in any sector)?
- Has your organisation tried to impact policies? On which issue? Was it successful? Why?
- Who are you in contact with at the MARD? (e.g. which department)? Why? What are your relations with other ministries?

Networks

- From which international, local organisations or research centres have you developed the closest links? Why? Upon which scientific networks (international research institutes, national research institutes) do you rely?

- Does your organisation take part to networks? Which other organisations take part to these networks? What are the objectives? What are the outputs?

THEMES EXPLORED WITH NGOs

Activities

- Present the past and current activities of your organisation in Vietnam. Have there been any changes in the focus of these activities? Why? Who decides on the scope of the activities of your organisation? How are you funded? On which issues is there a strong demand? Do you have specific requirements from donors or policy-makers?

Field experience

- Can you talk about upland management in the area where you worked? Were there changes in land-use? Why? Have people planted trees in the area where you work? Why? Do tree plantations provide reliable sources of incomes for farmers? To whom do they sell the raw material? At which price? Have they received support from the GoV? What are the main problems that they faced (markets, pests, technical issues)?
- What about grazing land availability? What has been the impact of FLA on common land management?

Perception of the challenges in the northern uplands

- What are the challenges regarding land and water management in the northern uplands in the next coming years? Upon which piece of evidence do you build your argumentation?
- When did you become aware of these issues? Are these problems new? Has your perception evolved? Do you think your perception is commonly shared by other people in your organisation? In other organisations? By policy-makers?

Perception of forest and land degradation

What do you think of land degradation extent in the northern uplands? Why is it important to afforest?

Policy changes

- In your opinion, why did the government decide to allocate forestry land to households?
- Why did the government decide to recognise communities as legal recipients of land use rights?
- Were there organisations or individuals that pushed towards this decision?
- What were the key events that resulted in a shift in policy and led to these decisions?
- What do you think of the benefits of the 5MHRP?

NGOs and policy links

- Who are your privileged interlocutors in the government? Who are you in contact with at the MARD? Why? At which administrative level do you mostly work ?
- Has your organisation tried to impact policies? On what issue? Was it successful? Why? Do you have an example of NGO that impacted on policies?

Networks

- Does your organisation take part in networks? Which other organisations take part to these networks? What are the objectives? What are the outputs?
- Have you worked with international research institutes or national research institutes? Which ones?

THEMES EXPLORED WITH RESEARCHERS

Activities
Presentation of the research organisation and activities.

Perception of the challenges in northern uplands
- What are the challenges regarding land and water management in the northern uplands in the next coming years? Upon which piece of evidence do you build your opinion?
- Are these problems new? Has your perception evolved over time on these issues? Why?
- Do you think your perception is commonly shared by other people in your research institute? In other research institutes? By policy-makers?
- Were there afforestation programmes in the area implemented where you worked? Were there successful?

Perception of forest and land degradation
- How has evolved the perception of forests in Vietnam over time?
- What do you think of land degradation extent in the northern uplands?

Policy changes
- In your opinion, why did the government decide to allocate forestry land to households?
- Why did the government decide to recognise communities as legal recipients of land use rights?
- Were there organisations or individuals that pushed towards this decision?
- What were the key events that resulted in a shift in policy and led to these decisions?
- What do you think of the benefits of the 5MHRP?

Research and policy linkages
- Has your organisation tried to impact policies? On which issues? How? Was it successful? Why?
- Do you have an example (in any field) of how research works from national institutes have impacted on policies? Are there other factors or organisations that can have a significant impact? Do you have examples?
- What are your contacts with the MARD?
- How is scientific evidence used for the elaboration of new policies?

Pressures on research institutes
- Who decides on the institute research programme? How is it decided? How are you evaluated? What is the share between state and international projects in the research budget of your research institute/centre?
- Under which form do you have to communicate results to the MARD? On which issues is there a strong demand from policy-makers / from donors?

Networking
- Does your organisation take part in networks? Which other organisations take part to these networks? What are the objectives? What are the outputs?
- With which international organisations have you been working with?

Annex P. Policy briefs designed from the lessons learnt in this study (in English and Vietnamese)

Annex Q. List of persons who received the policy briefs

Table Q-1. List of persons to whom policy briefs have been sent

Organisation	Person and position	Means of dissemination	Date
Information Center for Agriculture and Rural Development	Dr. Pham Quang Dieu - Acting Director	Email	24/10/07
IPSARD	Dr. Pham Bao Duong, Head of the Policy and Strategy Department	Meeting	27/09/07
IPSARD – Rural Development Center	Dr. Vu Trong Binh, Director	Meeting	20/09/07
	Mr. Pham The Tan, Forestry Researcher		26/09/07
	Ms. Nguyen Anh Chi, Information and Communication Officer		26/09/07
MARD	Mr. To Dinh Mai, Policy section, Forestry Department	Through Mr Tan, IPSARD-RUDEC	30/09/07
	Mr. Nguyen Ba Ngai, Deputy-Director, Forestry Department	Through Mr Tan, IPSARD-RUDEC	30/09/07
	Mrs. Le Thi Thua, Head of the Planning Section of the Forestry Department	Mail	4/10/07
VAAS	Prof. Nguyen Van Bo, President	Meeting	5/10/07
FSSP Coordination Office	Mrs. Nguyen Tuong Van, Deputy Director	Mail	4/10/07
	Dr. Paula Williams, Chief Technical Advisor		
Asian Development Bank	Mr. Le Phong Ho, Natural Resources Specialist	Mail	4/10/07
Embassy of Finland	Mr. Kari Mukala, Counsellor	Mail	4/10/07
European Commission Delegation	Mr. Hoang Thanh, Program Officer in Rural Development	Mail	4/10/07
Fauna and Flora International (FFI)	Dr. Mark Infield, Asia Pacific Regional Director	Mail	4/10/07
GFA Terra Systems consulting group	Dr. Joachim-F. Kirchhoff, Chief Technical Advisor for the MARD Project Afforestation in Thanh Hoa and Nghe An Provinces	Mail	4/10/07
GTZ	Dr. Bernd Liss, Consultant	Meeting, mail and email	27/09/07
	Dr. Laslo Pancel, Forestry Engineer, Chief Technical Advisor		
World Conservation Union (IUCN)	Mrs. Nguyen Thi Yen, Forest Program Officer	Mail	4/10/07
Japan International Cooperation Agency (JICA)	Mr. Oda Kensei, Expert in Forestry	Mail	4/10/07
Northern Mountains Poverty Reduction Project	Mr. Edwin Shanks, Chief Technical Advisor	Mail	4/10/07
Swiss Agency for Development and Cooperation (SDC)	Dr. Michel Evequoz, First Secretary, Assistant Country Director	Mail	4/10/07

Table Q-1 continued

Organisation	Person and position	Means of dissemination	Date
Swedish International Agency for Development (SIDA)	Mr. Tran Nam Binh, Program Officer in Forestry	Mail	4/10/07
UNDP	Mr. Nguyen Hai Nam, Programme Coordinator for the UNDP/EU Programme on Tropical Forest	Mail	4/10/07
World Bank	Dr. Nguyen The Dung, Operations Officer, Rural Development	Mail	4/10/07
CIFOR/ World Agroforestry Centre (ICRAF)	Dr. Minh Ha Fagerstrom, country representative	Mail	4/10/07
IWMI	Dr. Andrew Noble, Head IWMI – Southeast Asia	Email	13/10/07
	Dr. Chu Thai Hoanh, Senior Water Resources Specialist		
	Dr. Deborah Bossio, Team leader "Land Water and Livelihoods"		

Table Q-2. List of persons who received the policy briefs at the seminar "Analysing the gap between policy intentions and outcomes regarding forest policies in Northern Vietnam" organised at the SFRI, Hanoi, on the 2/10/07

Organisation	Name	Position
IRD	Dr. Didier Orange	Researcher
	Dr. Frederic Thomas	Researcher
SFRI	Dr. Tran Duc Toan	Vice-Director
	Mr. Nguyen Dui Phuong	Researcher
	Dr. Pham Quang Ha	Head of the department of Environment
	Mr. Vu Dinh Tuan	Researcher
IPSARD	Dr. Pham Bao Duong	Director of the Department of Strategy and Politics
Hanoi University of Science	Dr. Vu Kim Chi	Researcher
French Agricultural Research Centre for International Development (CIRAD)	Dr. Damien Jourdain	Researcher
	Dr. Virginie Diaz	Researcher
	Mr. Nguyen Hai Thanh	Researcher
French Embassy	Mrs. Nguyen Thi Vinh Ha	Programme Officer Agriculture - Environnement
Hanoi Agricultural University - Center for Agricultural Research and Ecological Studies	Mr. Tran Trung Kien	Researcher
Hanoi Agricultural University - Center for Agricultural Research and Ecological Studies	Mr. Tran Nguyen Bang	Researcher
Hanoi Agricultural University - Center for Agricultural Research and Ecological Studies	Mr. Nguyen The Phuong	Researcher
Hanoi Agricultural University - Center for Agricultural Research and Ecological Studies	Ms. Nguyen Thi Hai Ninh	Researcher
Hanoi Agricultural University - Center for Agricultural Research and Ecological Studies	Mr. Pham Tien Dat	Researcher
University of Sydney	Mrs. Georgina Houghton	Ph.D. student and development practitioner
University of Santa Cruz	Mr. Peter Towbin	Ph.D. student